CONSTRUCCEP LINE
SPECIAL PRODUCTS FOR THE CONSTRUCTION INDUSTRY
PROAS (PRODUCTOS ASFÁLTICOS S.A.) is a company in the CEPSA Group, a leader in the exploration, refining and commercialisation of petroleum derivatives. PROAS was founded in 1957 and, within the CEPSA Group, it is responsible for the commercialisation of the bitumen obtained in the Group’s refineries and for development, manufacture and commercialisation of its derivatives.

Since its founding, PROAS has worked to develop an innovative culture oriented towards creating new products and applications for these, for which it has invested significant efforts and resources in the development of world-class technology. This achievement has been made possible through the efforts of an outstanding team with profound knowledge of bitumen transformation technology, focused on the goal of developing new applications and commercialising them, which has enabled PROAS to achieve a solid reputation and recognition in the world of bitumen and its derivatives.

PROAS offers a complete catalogue of products that includes all the different types of bitumen and bituminous emulsions for use on roads, and derived products for use in industry and construction, including waterproofing agents for coating surfaces and use in sports facilities, as well as sealants, paints, etc.

Following the guidelines issued by the CEPSA Group, PROAS has adopted and maintains a firm commitment to all aspects related to Safety and the Environment, both at its facilities and in its products and applications.

SINCE ITS FOUNDING, PROAS HAS WORKED TO DEVELOP AN INNOVATIVE CULTURE ORIENTED TOWARDS CREATING NEW PRODUCTS AND APPLICATIONS FOR THESE, WHICH HAS ENABLED PROAS TO ACHIEVE A SOLID REPUTATION AND RECOGNITION IN THE WORLD OF BITUMEN AND ITS DERIVATIVES.
INTRODUCTION

PRODUCTION OF BITUMEN

PROAS bitumen is obtained during the crude oil refining process that takes place in the refineries of the CEPSA Group located in La Rábida (Huelva) and Tenerife (Canary Islands). In addition, PROAS participates in the capital of ASESA (Asfaltos Españoles S.A.), a company 50% owned by CEPSA. The bitumen of the CEPSA Group is obtained from certain specific types of crude oil that are rich in certain components with the goal of guaranteeing the production of high quality bitumen.

PRODUCTION OF BITUMEN DERIVATIVES

The basic products are obtained directly from the refining process, and the PROAS factories are where the wide variety of more or less complex and high quality derivatives that make up the PROAS catalogue are produced. In this way, PROAS factories produce the different types of bituminous emulsions, bitumen and special derivatives for industrial applications and to support the construction industry, mainly for waterproofing and paving, in addition to mastics and paints. It also manufactures a family of polymer modified bitumen (PMB) products through the addition of suitable reagents that produce a chemical reaction between the polymer and the bitumen, making these products the most stable and versatile on the market, as well as a benchmark for these types of binders. The latest developments worthy of note include bitumen modified with rubber powder from scrap tyres, low temperature bitumen, which offer better optimisation of the road network, and bio-emulsions formulated with more environmentally-friendly raw materials.

DISTRIBUTION

After the bitumen is manufactured in the refineries, it is distributed by ship or in tank trucks to PROAS factories for storage and subsequent transformation. The factories, after producing the corresponding derivative products, serve as storage and logistics centres from which the products are supplied to final customers in suitable containers and formats, or in specially prepared and thermally insulated tank trucks.

LABORATORY AND R&D+i ACTIVITY

Among its facilities at the Alcalá de Henares (Madrid) factory, PROAS has a Laboratory and Research Centre equipped with cutting-edge technology for new development. It provides a Technical Assistance Service to its customers that is specialised in each of the products.
PROAS has its main office in Madrid. With a significant share of its domestic markets on the Iberian Peninsula (Spain and Portugal), PROAS has been working intensively on its export operations, and has achieved a significant presence in different foreign markets and established relationships with the main consumers of these types of products in different countries in Europe, the Mediterranean basin, North and Central Africa and America.

The strategic position of CEPSA refineries on the peninsula and the proximity of the most of them to major shipping hubs enable it to achieve a high degree of flexibility and competitiveness in its export operations.

PROAS is developing policies aimed at consolidating its presence in the export markets where it is already present and boosting its commercial expansion to new geographic areas.

### COMMERCIAL ACTIVITY

### STRATEGIC GOALS

- **TO BE RECOGNISED AS A LEADER BASED ON ITS TECHNOLOGICAL CAPABILITY IN THE WORLD OF BITUMEN AND DERIVATIVES.**
- **TO OFFER A WELL DEVELOPED AND UP-TO-DATE CATALOGUE OF DERIVATIVES.**
- **TO DEVELOP A CULTURE OF PROXIMITY AND COLLABORATION WITH ITS CUSTOMERS ORIENTED TOWARDS OFFERING THEM SPECIFIC SOLUTIONS AND ANTICIPATING THEIR NEEDS.**
PROAS has developed a line of high technology products for application in the world of construction. These products, perfectly adapted to the current needs of the market and to their final applications, are suitable for both large-scale use and small consumers. The CONSTRUCEP line includes all the PROAS products developed for this market and used mainly in the protection and waterproofing of surfaces, as well as joint sealants and special pavements.

These products are used both in building construction and civil works. They are easy to use and respectful of the environment.

Customers are supplied through different specific formats for each product and market, all under the most stringent quality and safety standards.

PROAS has a Technical Assistance Service that offers specialised advice on the application of these products.

**CONSTRUCEP**

- **PAVING AND CIVIL WORKS**
  - PROAMASTIC ASFÁLTICO
  - PROAMASTIC SINTÉTICO
  - PROAMASTIC SPORT
  - PROAMASTIC P
  - APT
  - PROAMASTIC FIBRA

- **SEALING**
  - JUNTOPLAST SUPER
  - JUNTOPLAST PREMOLDEADO
  - JUNTOPLAST C

- **WATERPROOFING**
  - PROMULSIT
  - PROALASTIC

- **PROTECTION / PRIMING**
  - IMPRIMUL
  - NEWPRIMER
  - IA-20, IA-20R, IA-21, IA-22
  - DISPRIMER
SPECIAL PRODUCTS FOR THE CONSTRUCTION INDUSTRY

PROAMASTIC ASFÁLTICO
Bituminous slurry composed mainly of selected aggregates and a bituminous emulsion with high stability, which gives the application surface a perfect finish. It serves to seal open surfaces, protect weathered application surfaces and prevent premature wear.

- **APPLICATIONS:**
  - Paving of garages and parking lots.
  - Paving of industrial buildings with light traffic.
  - Sealing of hard shoulders, medians and traffic islands.
- **FORMATS:**
  45-kg cardboard drums and 540-kg pallets.

PROAMASTIC SINTÉTICO
Synthetic slurry composed mainly of selected aggregates and acrylic resins, providing a suitable aesthetic finish for hydraulic concrete and asphalt aggregate pavement.

- **APPLICATIONS:**
  - Hard shoulders, medians, traffic islands, bicycle lanes, promenades and sidewalks.
  - Paving of garages, parking lots and sports courts.
  - “Ecological” routes, tourist walks, footpaths, etc.
- **FORMATS:**
  45-kg cardboard drums and 540-kg pallets.
  Available in a wide range of colours: red, green, albero yellow, grey, black and blue.

PROAMASTIC SPORT
Synthetic slurry composed mainly of selected aggregates and acrylic resins which provides a fine texture for sports courts following application of Proamastic Sintético.

- **APPLICATIONS:**
  - Athletic surfaces.
- **FORMATS:**
  45-kg cardboard drums and 540-kg pallets.

PROAMASTIC P
Water-based acrylic paint with mineral fillers that gives the surface a coarser texture than that obtained with APT paint, resulting in an anti-slip finish.

- **APPLICATIONS:**
  - Protection of pavements and facings, both indoors and exposed to the elements.
  - Pavement finish for garages, parking lots and other surfaces.
- **FORMATS:**
  25-kg buckets and 22-bucket pallets (550 kg).
  Available in a wide range of colours: red, green, albero yellow, grey, black and blue.

APT
Water-based acrylic paint that provides high resistance to abrasion and sunlight, as well as to the alkalinity of the cement.

- **APPLICATIONS:**
  - Vertical facings.
  - Finish for pavement in garages and parking lots, industrial buildings with light traffic, sports courts, hard shoulders, medians and traffic islands, bicycle lanes.
  - Recommended for use with a 50% dilution in water as a primer for application surfaces before spreading Proamastic.
- **FORMATS:**
  25-kg buckets and 22-bucket pallets (550 kg).
  Available in a range of colours: black, white, grey, red, albero yellow, green and blue.
SPECIAL PRODUCTS FOR THE CONSTRUCTION INDUSTRY

SEALING

JUNTOPLAST PREMOLDEADO
Bituminous mastic with plasticisers, fillers and other additives, supplied in cord format. Its use in sealing operations at ambient temperature guarantees the water tightness of joints in concrete structures due to its high resistance to ageing.

- **APPLICATIONS:**
  Sealing of expansion joints, terraces, channels, non-potable water tanks, etc.

- **FORMATS:**
  22-kg boxes in cords of 20 or 25 mm Ø and 20-box pallets (440 kg).

JUNTOPLAST SUPER
Bituminous mastic with plasticisers, fillers and other additives that is easy to apply with moderate preheating.
This is a product with low creep once applied, and it provides good adherence to joint edges, allowing joint movement without cracking or spalling.

- **APPLICATIONS:**
  Sealing of expansion joints, terraces, channels, tanks, etc.

- **FORMATS:**
  30-kg buckets and 22-bucket pallets (660 kg).

JUNTOPLAST C
Polymer modified bitumen mastic with mineral fillers for hot application.
Complies with the UNE EN 14188-1 standard for hot applied, elastic and non-fuel resistant sealant products (N1).

- **APPLICATIONS:**
  Sealing for closing cracks in bituminous pavement and sealing joints in concrete pavement.

- **FORMATS:**
  20-kg bags.
**PROMULSIT**

Non-ionic bituminous emulsion which, after application and drying, leaves a continuous film of asphalt bitumen that is resistant to water and the alkalinity of the cement. Complies with UNE 104 231 Type ED.

- **APPLICATIONS:**
  - Protection against dampness in walls, foundations, dividing walls, etc., in both new construction and renovation.
  - Priming and preliminary surface preparation for other waterproofing or paving treatments after dilution to 20% in water (1 Promulsit: 4 water).

- **FORMATS:**
  25-kg cans and 22-can pallets (550 kg).

**PROALASTIC**

Anionic modified bitumen emulsion with perfect adhesion to a great number of surfaces, resulting in a waterproof and highly elastic layer with high performance characteristics.

Complies with UNE 104 231 Type EA.

- **APPLICATIONS:**
  - Waterproofing facings, tanks, terraces and coverings.
  - Waterproofing bridge decks, can be used in combination with a geotextile.
  - Vapour barrier in cold-storage rooms.
  - Adherence of asphalt sheets made of modified bitumen.

- **FORMATS:**
  25-kg cans and 22-can pallets (550 kg). Bulk supply in tank trucks of 21 t at minimum and 200-litre drums.
CONSTRUCEP LINE

SPECIAL PRODUCTS FOR THE CONSTRUCTION INDUSTRY

PROTECTION / PRIMING

**IMPRIMUL**
Non-ionic bituminous emulsion for priming, outstanding application and high performance.
Can be applied to a great number of surfaces.
- **APPLICATIONS:**
  - Priming and preparation of surfaces.
  - Adherence of asphalt sheets.
- **FORMATS:**
  25-kg buckets and 22-bucket pallets (550 kg).

**NEWPRIMER**
Water-based anionic bituminous emulsion with a high penetration capability, which gives the residue excellent adherence to the application surface.
Can be applied to a great number of surfaces.
Complies with UNE 104 231 Type EA.
- **APPLICATIONS:**
  - Priming and preparation of surfaces.
  - Adherence of asphalt sheets.
- **FORMATS:**
  24-kg buckets and 22-bucket pallets (528 kg).
SPECIAL PRODUCTS FOR THE CONSTRUCTION INDUSTRY

PROTECTION / PRIMING

IA-20, IA-20R, IA-21
Solvent-based asphalt paint with additives, with different formulations that make it possible to provide specific solutions.
IA-20R incorporates a hydrocarbon resin that gives the treated surface a glossy finish.

● APPLICATIONS:
  Protection of metal and concrete surfaces.

● FORMATS:
  22-kg buckets and 22-bucket pallets (484 kg) and 200-litre drums.

DISPRIMER
Asphalt paint composed of modified bitumen and aromatic solvents that provides outstanding protection to all types of surfaces.
Complies with the requirements of the UNE 104 234 standard for asphalt-based priming paints (type I).

● APPLICATIONS:
  • Priming and preparation of porous surfaces that will subsequently be waterproofed or treated with other asphalt products.
  • Anti-corrosion protection of metal surfaces.
  • Surface anti-moisture protection of concrete elements.

● FORMATS:
  22-kg buckets, 22-bucket pallets (484 kg) and 200-litre drums.

IA-22
Asphalt paint composed of asphalt bitumen and organic solvents that provides outstanding protection to all types of surfaces.
Complies with the requirements of the UNE 104 235 standard for diluted asphalt-based paints for protection (type II).

● APPLICATIONS:
  • Priming and preparation of surfaces that will subsequently be waterproofed or treated with other asphalt products.
  • Liquid waterproofing membrane in two-component systems.
  • Anti-corrosion protection of metal surfaces.
  • Surface anti-moisture protection of concrete elements.

● FORMATS:
  22-kg buckets, 22-bucket pallets (484 kg) and 200-litre drums.
1. SPORTS COURTS SYSTEM

1.1. DESCRIPTION

Rough-finish treatment that protects hydraulic concrete pavement or asphalt aggregate, improving their aesthetics, and is fully compatible with these types of application surfaces.

1.2. FIELDS OF APPLICATION

- Sports surfaces (tennis, basketball courts, etc.)
- Outdoor recreation areas.

1.3. PROPERTIES

- Approximate thickness: 2mm.
- Rough finish, very pleasant due to its fine texture, that provides an anti-slip surface that is comfortable and safe for users.
- Easy to handle and apply.
- Good adherence to the application surface.
- Good abrasion resistance.
- Resistant to sunlight and regional weather variations.
- Variety of colours.

1.4. MULTI-COAT SYSTEM

1.4.1. PRODUCTS:

**APT**
Acrylic paint formulated with styrenated resins in an aqueous dispersion.
Supplied in 25-kg cans.

**PROAMASTIC SINTÉTICO**
Mixture with a slurry-like consistency, composed of selected aggregates with controlled granulometry and synthetic resins. Supplied in 45-kg drums.

**PROAMASTIC P**

**PROAMASTIC SPORT**
Mixture with a slurry-like consistency composed of selected aggregates with controlled granulometry and synthetic resins. Supplied in 45-kg drums.

1.4.2. SYSTEM 1:

- One coat of priming with APT, diluted to 50%, with final coverage of 200-300 g/m², depending on the application surface. If the asphalt aggregate was executed recently and has a closed texture, priming is not necessary.
- Two coats of PROAMASTIC SINTÉTICO: with approximate coverage of 1-2 Kg/m² in the first coat and 1-1.5 Kg/m² in the second, depending on the texture of the application surface.
- Two coats of PROAMASTIC P: with coverage between 400-600 g/m² per coat, depending on the application surface and method.

1.4.3. SYSTEM 2:

- One coat of priming with APT, diluted to 50%, with final coverage of 200-300 g/m², depending on the application surface. If the asphalt aggregate was executed recently and has a closed texture, priming is not necessary.
- Two coats of PROAMASTIC SINTÉTICO: with approximate coverage of 1-2 Kg/m² in the first coat and 1-1.5 Kg/m² in the second, depending on the texture of the application surface.
- Two coats of PROAMASTIC SPORT: with approximate coverage of 0.8-1.2 Kg/m² in each coat, depending on the texture of the application surface.

1.4.4. FINAL CHARACTERISTICS OF THE SYSTEM:

- Abrasion resistance:
  The formulation has a high resin content that enables the products to resist both atmospheric agents and light traffic.
  NLT-320 Abrasion Test (g/m²) < 500.
- Slip resistance:
  Determination of the slip resistance/slipperiness value of pavements through the pendulum test based on the UNE-ENV 12633:2003 standard, Appendix A: Classification of flooring according to the Building Technical Code: Class 3 (Rₙ > 45).
1.5. DIRECTIONS FOR USE

• The surface to be primed must be cohesive, clean and free of dust, moisture and other substances (oil, lime, etc.).

• When applied to hydraulic concrete pavement, this should be analysed first to avoid adherence problems due to excessive polishing, weathering, moisture, etc. In the case of polished concrete, roughening the surface first is recommended.

• Application of the product at temperatures between 10-35ºC is recommended, in addition to avoiding its use under adverse weather conditions.

• Blend the products in the container before applying. In the case of Proamastic Sintético, remove the plastic bag from the cardboard drum and knead the product lightly on the floor before opening the bag.

• Apply in thin, uniform layers using a roller, rubber squeegee or other suitable utensil, letting each coat dry completely before applying the next (approximately 24 hours, depending on the ambient humidity and temperature).

• Application of thick coats to even out the surface is not recommended, as this could lead to poor curing of the product.

• NEVER add water directly to Proamastic Sintético, Proamastic Sport or Proamastic P, as this would cause them to lose their cohesive properties.

• Work tools can be cleaned with water before the product dries.

1.6. STORAGE AND CONSERVATION

• The containers should be constantly shielded from the elements so that they are protected against freezing and exposure to intense sunlight.

• The storage temperature should be no lower than 5ºC, as lower temperatures could affect product quality.

• The maximum recommended storage time is nine months from the manufacture date in the original container, properly closed and with no deterioration.
2. FUEL RESISTANT SYSTEM

2.1. DESCRIPTION:
Rough treatment with a slurry-like consistency, resistant to fuels, for application on asphalt aggregate pavement and concrete pavement.

2.2. FIELDS OF APPLICATION:
- Airports (runway ends, parking zones).
- Petrol stations and toll areas.

2.3. PROPERTIES:
- Approximate thickness: 2 mm.
- Fuel resistant.
- Fuel resistant.
- Rough finish.
- Good abrasion resistance.
- Easy to handle and apply.
- Fire-resistant.
- Good adherence to the application surface.
- Variety of colours.

2.4. MULTI-COAT SYSTEM

2.4.1. PRODUCTS:
- **APT**
  Acrylic paint formulated with styrenated resins in an aqueous dispersion. Supplied in 25-kg cans.

- **PROAMASTIC SINTÉTICO**
  Mixture with a slurry-like consistency, composed of selected aggregates with controlled granulometry and synthetic resins. Supplied in 45-kg drums.

2.4.2. SYSTEM:
- One coat of priming with APT, diluted to 50%, with final coverage of 200-300 g/m², depending on the application surface. If the asphalt aggregate was executed recently and has a closed texture, priming is not necessary.
- One coat of APT, without dilution, with final coverage of 250-300 g/m², depending on the application surface.
- A first coat of PROAMASTIC SINTÉTICO: with final coverage of 1-2 Kg/m², depending on the texture of the application surface.
- A second coat of PROAMASTIC SINTÉTICO: with final coverage of 1-1.5 Kg/m², depending on the texture of the application surface.

2.4.3. FINAL CHARACTERISTICS OF THE SYSTEM:
- **Fire resistance:**
- **Slip resistance:**
  Determination of the slip resistance/slipperiness value of pavements through the pendulum test based on the UNE-ENV 12633:2003 standard, Appendix A: Classification of flooring according to the Building Technical Code: Class 3 (Rₛ > 45).
- **Fuel resistance:**
  Fuel resistance category according to the UN-EN 12697-43 standard:
  - Good resistance to kerosene (A≤5% and B<1%).
  - Good resistance to petrol (A≤5% and B<1%).
- **Abrasion resistance:**
  The formulation has a high resin content that enables the products to resist both atmospheric agents and light traffic. NLT-320 Abrasion Test (g/m²) < 500.
2.5. DIRECTIONS FOR USE

- The surface to be primed must be cohesive, clean, free of dust, moisture and other substances (oil, lime, etc.).
- When applied to hydraulic concrete pavement, this should be analysed first to avoid adherence problems due to excessive polishing, weathering, moisture, etc. In the case of polished concrete, roughening the surface first is recommended.
- Application of the product at temperatures between 10-35ºC is recommended, in addition to avoiding its use under adverse weather conditions.
- Blend the products in the container before applying. In the case of Proamastic Sintético, remove the plastic bag from the cardboard drum and knead the product lightly on the floor before opening the bag.
- Apply in thin, uniform layers using a roller, rubber squeegee or other suitable utensil, letting each coat dry completely before applying the next (approximately 24 hours, depending on the ambient humidity and temperature).
- Application of thick coats to even out the surface is not recommended, as this could lead to poor curing of the product.
- NEVER add water directly to Proamastic Sintético, as this would cause it to lose its cohesive properties.
- Work utensils can be cleaned with water before the product dries.

2.6. STORAGE AND CONSERVATION

- The containers should be constantly shielded from the elements so that they are protected against freezing and exposure to intense sunlight.
- The storage temperature should be no lower than 5ºC, as lower temperatures could affect product quality.
- The maximum recommended storage time is nine months from the manufacture date in the original container, properly closed and with no deterioration.
3. BICYCLE LANE / PARKING LOT / BUS LANE SYSTEM

3.1. DESCRIPTION:
Rough-treatment finish that protects hydraulic concrete pavement or asphalt aggregate, improving its aesthetics, and is fully compatible with these types of application surfaces.

3.2. FIELDS OF APPLICATION:
- Bicycle lanes, promenades and pedestrian zones.
- “Ecological” routes (tourist walks, pilgrimage paths, etc.)
- Pavement in industrial buildings with light traffic.
- Pavement in garages and parking lots.
- Guided bus lanes.

3.3. PROPERTIES:
- Approximately thickness: 2 mm.
- Rough finish, very pleasant due to its fine texture, that provides an anti-slip surface that is comfortable and safe for users.
- Easy to handle and apply.
- Good adherence to the application surface.
- Good abrasion resistance.
- Resistant to sunlight and regional weather variations.
- Variety of colours.
3.4. MULTI-COAT SYSTEM

3.4.1. PRODUCTS:

APT
Acrylic paint formulated with styrenated resins in an aqueous dispersion. Supplied in 25-kg cans.

PROAMASTIC SINTÉTICO
Mixture with a slurry-like consistency, composed of selected aggregates with controlled granulometry and synthetic resins. Supplied in 45-kg drums.

3.4.2. SYSTEM:

- One coat of priming with APT, diluted to 50%, with final coverage of 200-300 g/m², depending on the application surface. If the asphalt aggregate was executed recently and has a closed texture, priming is not necessary.

- Two coats of PROAMASTIC SINTÉTICO: with approximate coverage of 1-2 Kg/m² in the first coat and 1-1.5 Kg/m² in the second, depending on the texture of the application surface.

3.4.3. FINAL CHARACTERISTICS OF THE SYSTEM:

- Abrasion resistance:
The formulation has a high resin content that enables the products to resist both atmospheric agents and light traffic. NLT-320 Abrasion Test (g/m²) < 500.

- Slip resistance:
Determination of the slip resistance/slipperiness value of pavements through the pendulum test based on the UNE-ENV 12633:2003 standard, Appendix A: Classification of flooring according to the Building Technical Code: Class 3 (R₃ > 45).

- Fuel resistance:
Fuel resistance category according to the UN-EN 12697-43 standard: Good resistance to petrol (A≤5% and B<1%).

- Fire resistance:
3. BICYCLE LANE / PARKING LOT / BUS LANE SYSTEM

3.5. DIRECTIONS FOR USE

- The surface to be primed must be cohesive, clean and free of dust, moisture and other substances (oil, lime, etc.).
- When applied to hydraulic concrete pavement, this should be analysed first to avoid adherence problems due to excessive polishing, weathering, moisture, etc. In the case of polished concrete, roughening the surface first is recommended.
- Application of the product at temperatures between 10-35°C is recommended, in addition to avoiding its use under adverse weather conditions.
- Blend the products in the container before applying. In the case of Proamastic Sintético, remove the plastic bag from the cardboard drum and knead the product lightly on the floor before opening the bag.
- Apply in thin, uniform layers using a roller, rubber squeegee or other suitable utensil, letting each coat dry completely before applying the next (approximately 24 hours, depending on the ambient humidity and temperature).
- Application of thick coats to even out the surface is not recommended, as this could lead to poor curing of the product.
- NEVER add water directly to Proamastic Sintético or Proamastic P, as this would cause them to lose their cohesive properties.
- Work utensils can be cleaned with water before the product dries.
3.6. STORAGE AND CONSERVATION

- The containers should be constantly shielded from the elements so that they are protected against freezing and exposure to intense sunlight.
- The storage temperature should be no lower than 5°C, as lower temperatures could affect product quality.
- The maximum recommended storage time is nine months from the manufacture date in the original container, properly closed and with no deterioration.
4. WATERPROOFING OF BRIDGE DECKS

4.1. DESCRIPTION

We are all aware of the importance of good waterproofing of bridge decks to prevent deterioration that could occur as a result of water filtration through the road surface and the expansion joints of the deck itself.

The design of reliable and effective waterproofing, which ensures protection of the structure, is one of the keys to achieving greater durability of this, and therefore it plays a primary role in preserving the service condition of bridges. The first signs of deficient waterproofing are water stains, calcium carbonate accumulations, etc., but if this is not corrected in time, the defects can degenerate into fissures, cracks and spalling of the deck concrete.

This is why the waterproofing of bridge decks should be given the importance it deserves, whether on railway, highway or pedestrian bridges.

The requirements for materials to be used in waterproofing are the following:

• Impermeable.
• With stable and durable mechanical properties.
• Elastic.
• Compatible with the materials of the application surface and provides good adherence to same.
• No toxicity.
• Easy to apply.
• If possible, economical.

In any bridge deck waterproofing project, it is advisable to define the most appropriate technique considering the specifics of the structure and the effects of its use.

4.2. PURPOSE OF WATERPROOFING

The main function is to protect the upper part of the deck from physical-chemical actions generated by the water and the agents dispersed or dissolved in it.

In conception and application, all the specific points should be taken into account to create a true “umbrella” effect. The effectiveness of waterproofing is based on the following:

• Cleanliness and preparation of the surface.
• Use of quality products.
• Good application technique.
• Overall treatment of the application surface.

In the case of road bridges, waterproofing, located between the concrete deck and the asphalt pavement layer(s), indirectly supports traffic and transmits its demands to the bridge deck, and therefore requires proper execution.

In the case of railway viaducts, the aggregate layer will protect the main waterproofing against the mechanical aggression of the sub-ballast and ballast layer, especially in cases of high-speed railway traffic.
4.3. IN-SITU WATERPROOFING SYSTEM WITH COLD APPLIED BITUMINOUS MORTARS CONTAINING FIBRES (PROAMASTIC-FIBRA).

Consists of waterproofing the deck by cold application of a bituminous mortar containing acrylic fibres using manual techniques. This system is especially recommended for waterproofing bridges with smaller surface areas because of its manual application.

The combination of the emulsion with the fibres allows for a higher binder content without the risk of oozing and enhances the water tightness of the mortar. It also produces a substantial improvement in the mortar by reducing its thermal sensitivity and increasing its flexibility.

The application surface for Proamastic Fibra must be clean. To apply it, proceed as follows:

- Prime with diluted Promulsit (4 parts water to one part Promulsit) or APT diluted in water to 50% (200-300 g/m²) and let dry for at least 12 hours. (Photo 1).
- Blend the product before applying if necessary.
- As a general rule, do not add water to the product, although a small amount can be added to facilitate handling.
- Apply cold using a rubber squeegee or other mechanical utensil suitable for this product that enables coverage of the entire surface. Proamastic Fibra is generally applied in a single coat and coverage varies depending on the texture of the application surface. Coverage values on the order of 2 Kg/m² are typical. If applying the product in two coats, let the first coat dry completely (leave for approximately 24 hours, depending on the ambient humidity) before applying the product corresponding to the second coat. (Photo 2).
- Spreading of the aggregate coat after the Proamastic Fibra coat has cured completely.

Photo 1: priming with diluted Promulsit.

Photo 2: application of Proamastic Fibra.
4. WATERPROOFING OF BRIDGE DECKS

4.3.1. CHARACTERISTICS OF THE MATERIALS

PROAMASTIC FIBRA BITUMINOUS MORTAR WITH FIBRES

This is a mixture with a pasty consistency composed of mineral fillers with controlled granulometry, a stable EAL-2 type bituminous emulsion with synthetic fibres:

<table>
<thead>
<tr>
<th>CHARACTERISTICS OF THE MORTAR</th>
<th>UNIT</th>
<th>STANDARD</th>
<th>RESULTS</th>
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<tbody>
<tr>
<td>Brookfield Viscosity (25°C, 5 rpm)</td>
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<td>%</td>
<td>-</td>
<td>0,5 -</td>
</tr>
<tr>
<td>Emulsion content</td>
<td>%</td>
<td>-</td>
<td>18 -</td>
</tr>
<tr>
<td>Permeability</td>
<td>-</td>
<td>NLT-327</td>
<td>Non-permeable</td>
</tr>
<tr>
<td>Flexibility at 4°C</td>
<td>mm</td>
<td>ISSA 146</td>
<td>150 -</td>
</tr>
</tbody>
</table>

Table 2. CHARACTERISTICS OF PROAMASTIC FIBRA

This system is very widely used in waterproofing bridge decks in this country. Its main advantages are cold application that is continuous, joint-free and stable at a wide range of temperatures. It can be applied to both dry surfaces and slightly damp ones (although in the absence of precipitation).

It is easy to apply, provides good adherence to the material and the top aggregate layer, and is resistant to construction traffic.

Although the impermeability of these mortars has been called into question at times due to residual porosity after evaporation of the water, its water tightness has been verified through testing. In addition to the composition of the mortar itself, this situation is helped by the heating and compacting of the top coat(s), and the outstanding performance of decks protected against the action of the water with these types of membranes has been proven.
**CONCLUSIONS:**

- Concrete bridge waterproofing systems that are continuous and totally adhered to the deck, without joints.
- Adherence to the deck, as well as to the covering layer, is total.
- It has high elasticity.
- Good resistance to cold/hot cycles.
- Crack-proof.
- Easy to apply.
- Durable.

Waterproofing in good condition is a guarantee of low-cost conservation, as repairs in these types of works can represent up to six times the original cost of the project.

If we consider the increase in heavy goods traffic on roads, we should adopt a mentality of waterproofing bridges and reducing the implementation time for maintenance work on them.