

A close-up photograph of a dark, textured cast stone surface, possibly a large sphere or a curved wall. The texture is granular and uneven, with some areas appearing lighter due to lighting. The background is blurred, showing more of the same material.

CAST STONE MAINTENANCE MANUAL

CARE by  Marshall's

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This manual is designed to give a generic overview of the cleaning regimes, solutions, methods and techniques to keep your Marshall's cast stone products aesthetically flawless.

The manual also discusses minor repairs of cast stone finishes for Marshall's/Escofet products.

This document is not designed to be exhaustive and extensive in the exacting requirements of every case. If you consider your cleaning or repair circumstance to be outside of the scope of this document, then please do not hesitate to contact our office and we will be happy to help you keep our products looking as new.

What is cast stone?

Cast Stone (or Concrete) is a composite construction material composed primarily of aggregate, cement and water. There are many formulations that have varied properties. The aggregate is generally a coarse gravel or crushed rock such as limestone, or granite, along with a fine aggregate such as sand. The cement, commonly Portland cement, and other cementitious materials such as fly ash and slag cement, serve as a binder for the aggregate.

Various chemical admixtures are also added to achieve varied properties. Water is then mixed with this dry composite which enables it to be shaped (typically poured) and then solidified and hardened into rock-hard strength through a chemical process known as hydration. The water reacts with the cement which bonds the other components together, eventually creating a robust stone-like material. Concrete has relatively high compressive strength, but much lower tensile strength. For this reason it is usually reinforced with materials that are strong in tension (often steel).



Regular cleaning of the installed product should be completed in line with the overall maintenance regime as specified by the client.

Cast stone products do not require any specific maintenance during their lifetime, estimated to be more than 30 years, but Marshall's advise that a maintenance regime is adopted with recurrent frequency of 3 months to guarantee a high level of product appearance and performance.

The natural porosity of building materials, including concrete, is the main cause of their deterioration, as it facilitates infiltration by water, dirt, paint and other external agents that degrade the appearance of products and reduce their resistance over time.

As part of the ongoing quality improvement policy at Escofet and Marshall's, we always apply the latest generation treatment to our concrete product surfaces to maintain their appearance, their finish and protect the material from aggressive agents.

Regular Cleaning Instructions

Our maintenance protocol includes spraying with water at varying intervals, depending on usage intensity, and the renewal of the protective water repellent treatment applied at production stage to acid-etched and polished surfaces.



ACID ETCHED STONE

Acid-etched street furniture is treated with a water and oil-proof solution that does not affect the concrete's original colour or its texture.

Solution Features:

- Ø Water resistant, prevents harmful effects of moisture and ice.
- Ø Prevents permanent oil stains, grease and incrustations due to pollution.
- Ø Delays surface ageing.

Use hot water under pressure to remove the most difficult stains and graffiti. The simple effect of rain may be enough to remove milder cases.

POLISHED STONE

Street furniture with a polished finish is treated with a water and oil-proof solution which enhances the original colour and shine of the polished concrete.

Water jets can be used to clean and restore surfaces, with the addition of detergent in extreme cases of paint or graffiti damage, with no risk of harm to the surface or the crystallized resin treatment.



Impact due to vandalism or accidental blows, minor chipping or loss of material can be repaired with a kit supplied by Marshall's that includes a special formula for each colour and a specific technique for acid-etched products and polished surfaces.

To repair small-scale chipping and loss of material, we can supply a free repair kit for each specific aggregate formula and surface finish, along with instructions for use.

Please check the product code and Appendix for correct colour matching.

REPAIR KIT COMPOSITION FOR ACID ETCHED FINISHES:

BERROQUEÑO GREY

- Ø 500 gr. Portland cement
- Ø 250 gr. marble powder
- Ø 200 gr. white cement
- Ø 1000gr. Berroqueño 2.5 to 6
- Ø 250 gr. Berroqueño grit

BEIGE

- Ø 750 gr. beige grout
- Ø 200 gr. marble powder
- Ø 1000gr. beige 2-3-5
- Ø 250 gr. silica

NIGRA

- Ø 750 gr. Black grout
- Ø 200 gr. Marble powder
- Ø 1000gr. Salichs black 2-3

WHITE

- Ø 700 gr. white cement
- Ø 250 gr. marble powder
- Ø 30 gr. Spain white
- Ø 1000 gr. hard white 1-2-3
- Ø 250 gr. silica

NAGUISA GREY

- Ø 750 gr. Naguisa grey grout
- Ø 250 gr. marble powder
- Ø 200 gr. hard white 1, 2, 3
- Ø 800 gr. Granomar grit

ALICANTE RED

- Ø 750 gr. Alicante red grout
- Ø 200 gr. marble powder
- Ø 1000 gr. Alicante red 2-3-5
- Ø 250 gr. silica

REDDISH

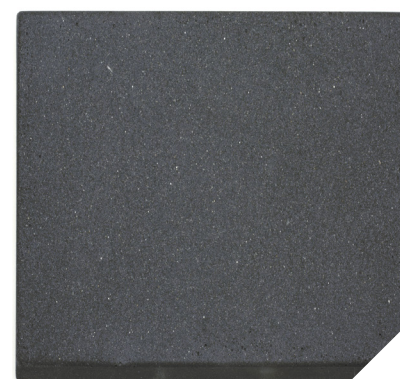
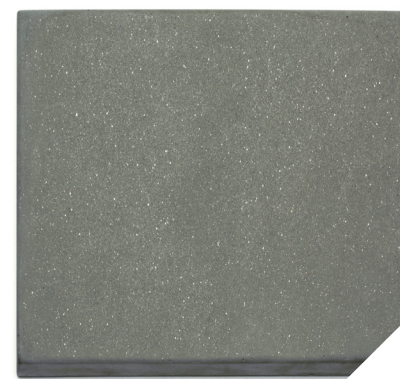
- Ø 750 gr. red grout
- Ø 200 gr. marble powder
- Ø 700 gr. chocolate No. 2
- Ø 300 gr. Chocolate No. 1

GREY WHITE

- Ø 750 gr. Socrates grout
- Ø 1000 gr. hard white 1-2-3

AMERICA'S CUP

- Ø 750 gr. America's Cup grout
- Ø 200 gr. marble powder
- Ø 700 gr. Berroqueño 2-5-6
- Ø 400 gr. sand topdressing



PROCEDURE FOR REPAIRING ACID- ETCHED SURFACES

Apply the mixture to match the colour and texture of the concrete, using the following dosages as a guide (if not using the aforementioned repair kit)

Grey Concrete:

- Ø 1 part marble powder
- Ø 4 parts white cement
- Ø 2 parts Portland cement
- Ø 1 part sand
- Ø 4 parts gravel

Coloured Concrete:

- Ø 1 part marble powder
- Ø 2 parts coloured cement
- Ø 1 part sand
- Ø 4 parts gravel

Process

1. Use water to moisten the area to be repaired.
2. Ensure that the repair is well compacted, leaving it slightly raised above the rest.
3. Cover the repair with a damp cloth for 8 hours to ensure uniform curing.
4. Wait 2 to 3 hours prior to acid washing.
5. Protect hands with rubber gloves when using acid. Wash the repaired area and the surrounding pavement with abundant water immediately afterwards. 1:4 hydrochloric acid-water mixture.

PROCEDURE FOR REPAIRING POLISHED SURFACES

Apply the mixture to match the concrete colour and texture, using the following dosages as a guide:

Grey Concrete:

- Ø 4 part white cement
- Ø 2 parts Portland cement
- Ø 1 part sand
- Ø 4 parts gravel

Coloured Concrete:

- Ø Coloured cement included
- Ø 1 part sand
- Ø 4 parts gravel

Process

1. Use water to moisten the area to be repaired.
2. Ensure that the repair is well compacted, leaving it slightly raised above the rest.
3. Cover the repair with a damp cloth for 24 hours to ensure uniform curing.
4. Sand the surface with a 60-grit disk or sandpaper to ensure a uniform texture on the repaired area and then sand with another 220-grit disc for a fine finish.



WEATHER RESISTANCE

Fissuring in concrete products does not normally require or permit repairs and in the case of reinforced items, it does not compromise their structural stability. Stainless steel and galvanized reinforcements are corrosion resistant, eliminating the risk of failure due to expansion by rusted steel.

Water absorption and freeze-thaw cycles in cast stone products can cause weathering, a reproduction of the process that takes place in natural rock.

To standardise the weather resistance of cast stone products, tests are carried out on water absorption and freezing and thawing resistance. Concrete and reinforced concrete models must comply with Standard EN 13198:2003 (Section 4.3.5).

Classification Clarification

Classification A, B and C, depending on the type of environmental exposure that determines reinforcement coating.

A. Products not subject to freeze-thaw conditions.

Requirement: Water absorption $<7.5\%$

B. Products subject to freeze-thaw conditions without contact with de-icing salts.

Products exempt from testing: water absorption $<7\%$ / minimum strength class C30/37

In other cases, conduct direct freeze-thaw tests. (EN 13198:2003 Annex A).

C. Products subjected to freeze-thaw conditions in contact with de-icing salts.

Products exempt from testing: water absorption less than 6% / minimum strength class C35/45. In other cases, conduct direct freeze-thaw tests with de-icing salts.

(EN 13198:2003 Annex B)

TESTS

The following tests have been conducted to certify the standard concrete compositions for this standard:

- Ø Water absorption UNE EN 13369/2001 (Annex J)
- Ø Freeze-thaw resistance UNE 13198/2003 (Annex A)

Water absorption tests were performed on samples treated with water repellent in order to determine the material's real water absorption rate, close to 2% with water repellent treatment.

Freeze-thaw tests were performed on samples treated with repellent on the upper side.

Conclusions

For type A and B exposure, the results comply with the respective standard requirements in samples with repellents, including the freeze-thaw cycle test.

For type C exposure, neither logical nor desirable, composition GREY RG with repellent provides the best resistance.

The standard freeze-thaw tests on material with de-icing salts permit a much higher level of material loss than the amount accepted by our own quality standards (1.5 kg/m^2)

It is important to note that all ESCOFET 1886 SA products are treated with repellent, regardless of whether this is required by the test results.



UHPC is a class of concrete defined by its exceptionally high strength and durability. It was developed in the 1980s for specialized applications that demanded superior strength and corrosion resistance – marine anchors, piers and seismic structures.

Over the last three decades, use of UHPC has expanded to applications requiring its high strength in narrow profiles, such as bridge spans and building façades. In these cases, the material's strength, wear resistance, lighter weight and lower life cycle costs have been the driving determinates. Escofet is the first Spanish company to unite formulation, manufacturing and design to create UHPC products that address the requirements of the architectural and design profession

What is Liquid Stone?

Liquid Stone is a new ultra high performance concrete (UHPC) with unlimited potential in the architecture, landscape and product design industries. Liquid Stone's unique formula and manufacturing process, developed with our research partners in iMat-Construction Technologic Center Polytechnic and Polytechnic University of Catalonia yield a UHPC with superior strength, durability and colour saturation that can be cast in a wide variety of shapes and patterns

Material

Liquid Stone is a new UHPC distinguished by its high matrix density. In partnership with UHPC specialists in Polytechnic University of Catalonia we've developed a formulation optimizing the particle size of each material to ensure a densely packed concrete matrix. The tight packing of particles creates stronger chemical bonds and lower water absorption, which yields extremely high compressive, tensile and flexural strength. The resulting material exhibits a beautiful surface with integral pigment that stands up to water, salt and corrosive environmental contaminants.

Performance

Liquid Stone's performance on all fronts is extraordinary. Exceptionally high compressive, tensile and flexural strength; durability in a wide range of conditions and climates; highly saturated integral colour – all achieved with minimal waste and environmental impact - makes Liquid Stone a leader in performance.

Durability

Traditional precast concrete and GFRP panels often fail because water and salt (marine and road) are absorbed over time into its pores. The water then freezes and cracks the concrete from the inside out; the chloride ions penetrate the matrix and eventually break down steel reinforcements. Most GFRP is coated to prevent infiltration of the concrete matrix by water and harmful environmental contaminants. In contrast, Liquid Stone is so dense and has so few pores that it absorbs almost no water over time and does not require a coating to enhance durability; therefore, it has excellent freeze-thaw performance and is highly resistant to salt. This extremely dense material matrix has the added benefit of protecting the pigments and improving UV performance.

Colour

The colour of Liquid Stone is integrated throughout the material. By adding pigment to the mix, Liquid Stone's colour is consistent throughout, unlike many other materials that are colour-coated. A wide range of colours and hues can be achieved and offer rich saturation and colour fastness. Our pigments have been tested and selected as a result of their UV performance, stability and visual appeal. In addition to the standard colours developed by our designers and engineers, we can create and match a variety of custom colours.



Liquid Stone - Rio

UHPC TECHNICAL PROPERTIES

Concrete consistency fluid / liquid, with a minimum cement content 700kg/m³ with organic fibres, inorganic or metal and siliceous aggregates smaller than 1 mm.

COMPRESSIVE STRENGTH

- Ø UHPC 90-150 MPA
- Ø UNE-EN 12390/2001

FLEXION RESISTANCE

- Ø UHPC 16-35 MPA
- Ø UNE-EN 12390/2001

ABSORPTION OF WATER

- Ø UHPC 6.50% without the use of repellents
- Ø UNE-EN 1339/2004

RESISTANCE TO FROST

- Ø UHPC 0 Kg/m² Loss of mass after 28 cycles of freezing / thawing (with dicing salts)
- Ø UNE-EN 1339/2004

WEAR RESISTANCE OF FRICTION

18.3 mm UHPC (Average width of the track)

- Ø UNE-EN 1339/2004

IMPACT RESISTANCE

- Ø UNE-EN 127748-1/2006





GR P
GRIS PULIDO



GR
GRIS DECAPADO



CA P
GRIS C.A. PULIDO



CA
GRIS C.A. DECAPADO



GN
GRIS NAGUISA



GB P
GRIS BLANCO PULIDO



BL P
BLANCO PULIDO



BL
BLANCO DECAPADO



BG P
BEIGE PULIDO



BG
BEIGE DECAPADO



RA P
ROJO ALICANTE PULIDO



RA
ROJO ALICANTE DECAPADO



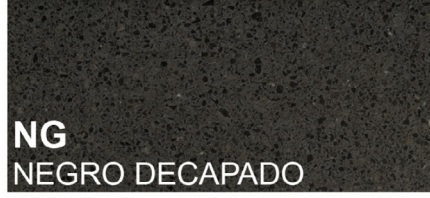
RJP
ROJIZO PULIDO



RJ
ROJIZO DECAPADO



NG P
NEGRO PULIDO



NG
NEGRO DECAPADO



B&WP
BLACK & WHITE PULIDO

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