Marshalls
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# Data Sheet - Properties & Processes

CSTB2

Cast Stone is comparable to natural stone as a building material in both appearance and performance, yet it is readily available and provides a cost-effective alternative on projects from simple domestic housing to complicated schemes such as commercial and historical buildings. It can be formed to almost any shape and size the designer wishes and can equal, or even surpass, the technical capabilities of natural stone in terms of strength, moisture penetration and colouring. It is ideal for both new and refurbishment work, particularly in areas of sensitive planning constraints or where stone is a predominant building material.

Cast Stone is defined in BS1217:2008, and by the trade association, UKCSA, as being "any material manufactured with aggregate and cementitious binder, intended to resemble in appearance, and which may be used in a similar way to, natural stone".

Cast Stone is either homogenous throughout or may consist of facing and backing mix. It is produced either as a semi-dry process which gives components a slightly open texture face, similar to sawn natural stone, or as a wet cast process which gives a much closer face texture and allows larger structural components, and those with complex reinforcement to be reproduced.

RELEVANT STANDARDS/POINTS OF REFERENCE
BS1217:2008 Specification for Cast Stone
BS5628 Code of Practice for Use of Masonry
BS8110 Structural Use of Concrete
UKCSA United Kingdom Cast Stone Association (www.uksca.co.uk)
BS EN 771-5: 2011 Specification for Manufactured Stone Masonry units.

## TERMINOLOGY

Marshalls manufactures architectural dressings by both the semi-dry, fibre reinforced (FRCS) and wet cast methods. Units produced by each of the methods are often described under any of the following terms: "Cast Stone", "Reconstituted Stone", "Reconstructed Stone" or "Simulated Stone".

In order that we maintain consistency within the Company and to support the marketing position of the trade association, UKCSA, PD Marshalls will promote and make reference to its architectural dressings range of products in the form of "Cast Stone".

## COMPANY POSITION

As a company, Marshalls feels that having the facility to offer products manufactured by each of the processes (wet cast, fibre reinforced (GRC) and semi-dry) allows the market to determine its preference. We will not actively promote one against the other, but merely allow the client to choose – that is not to say we could not guide the client to what we feel may be the most appropriate process for either a particular application or to suit our production capacity and scheduling. This flexibility for both sides is an important asset that many of our competitors simply cannot offer.

## PRODUCT PROPERTIES

To enable a consistent message to be provided to the market, it is important to recognise the properties of the product relative to the standards, and also the particular manufacturing process. The following guidance notes should provide the necessary information to assist in sales/technical issues.

**Colour**
Natural stone finishes vary considerably and are dependent upon the hardness of the stone and the finishes of the visible faces. Colours vary typically from white, like Portland; through creamy Bath, grey brown; York, pink and black granites; to multi-coloured like marble.

We, as manufacturers of more economical alternatives, use natural mineral aggregates with a cementitious binder to achieve the same colour as the natural stone which we are matching, or to create bespoke colours for a particular project.

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Whilst customers often refer to their requirement as Bath, Portland etc., this is never clear enough. One man's Portland is another man's Bath. As an illustration, look down from the surrounding hills, or drive through Bath in Avon where the whole town has been built from local stone. You will see virtually every hue, all of them in someone's eyes, "Bath".

The processes sometimes use pigments to enhance the appearance of the units. This saves the expense of storing many different aggregates and gives a range of colours not obtainable in natural stone.

We advise that a comprehensive sample approval process is followed for each project.

**Texture**
Natural stone textures vary all the way from rough hewn rock face, through sawn, sandy, rubbed smooth to polished – in fact almost anything simulated. Similarly, the alternative products that we manufacture can vary in the same way. It is all a question of manufacturing process, time and effort.

The texture options are often dictated by the process and we advise a comprehensive sample approval system is adopted for each project.

## PRODUCTION METHOD

**Semi-Dry Cast**
As the name implies, it involves the use of low water content or 'earth moisture' mix. The fine aggregates used in the mix are graded so that thorough compaction can be achieved. Computerised batching is typically used to ensure the consistency of materials and measure water content. The semi-dry approach enables repetitive elements to be cast in considerable numbers and relatively quickly. Surfaces tend to have an open texture, like sawn natural stone.

The process is most suited to traditional sized elements to be such as cills, heads, string courses and copings. Structural items can be produced so long as the reinforcement requirement does not inhibit compaction. The ability to reinforce semi-dry cast stone is yet another advantage over natural stone. Units are generally cast face down into wooden moulds using pneumatic or electric sand rammers. Alternatively, steel hand moulding machines or 'machine mould' can be used to produce consistently sharp, crisp arrises suitable for ashlar and details such as L quoins and plain band courses. The benefits of machine mould are even shorter lead times and lower cost.

**Wet-Cast**
The wet cast method is similar to casting in plaster and provides a close-grained surface. It allows precise rendering of fine detail and, for structural elements, the use of complex reinforcements. Typical finishing techniques include acid etching, grit blasting, hand or mechanical tooling and polishing. Wet cast uses considerably more water than the semi-dry process and is generally a through mix of the finished face. The mix design is especially critical to the process and the finished appearance. After the mix is poured into the mould, it is compacted using a vibrating poker or vibrating table.

Longer lead times are required for wet cast stone as the process generally yields only one cast per mould per day.

**Fibre Reinforced Cast Stone**
This process incorporates fibre reinforcement into a higher water content mix that can be either poured or sprayed into moulds, from which the product is demoulded the following day. A dense product with a close face texture is achieved which can be varied by the use of secondary surface treatments.

Often the units are produced in thin sections which reduces the weight and associated manual handling issues, and offers the opportunity, through careful design and use of fixings, for retrofitting to the structure.

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Longer lead times are required for fibre reinforced cast stone as the process generally yields only one cast per mould per day.e is a dry cast mix. Whereas a normal semi-dry mix is only 'earth dry' the introduction of slightly more water and dispersed glass fibre reinforcement during manufacture allows us to produce a hybrid product, 'FIBRE-CAST' which results in the performance of a wet cast unit with all its inherent properties, but with the benefits of repetitive production of a semi-dry unit.

The result is high density, high strength components with integrated glass fibre reinforcement which have a similar appearance to dry cast but which have wet cast performance e.g. High strength, strong arrises etc.

The finish of 'FIBRE-CAST' units may have a very slight 'plucked' appearance. This has the benefit of offering a key to any paint or applied finish if required, although they are perfectly suitable when left in their natural state. In terms of weight, durability etc., the 'FIBRE-CAST' components act in a similar manner to dry cast and wet cast units.

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