Natural Roman Cement

History:

In 1796 the Reverend James Parker Patented Roman cement which became highly desirable for its long term durability. After 1824 Roman cement declined due to the introduction of Portland cement (OPC) which, in the present day, is burnt at fusion temperatures and can have some undesirable effects on historic buildings.

Natural Roman Cement (NRC) has a better compatible strength with historic masonry and renders due to the special processing of gault stone and the lower kiln temperatures used.

Description:

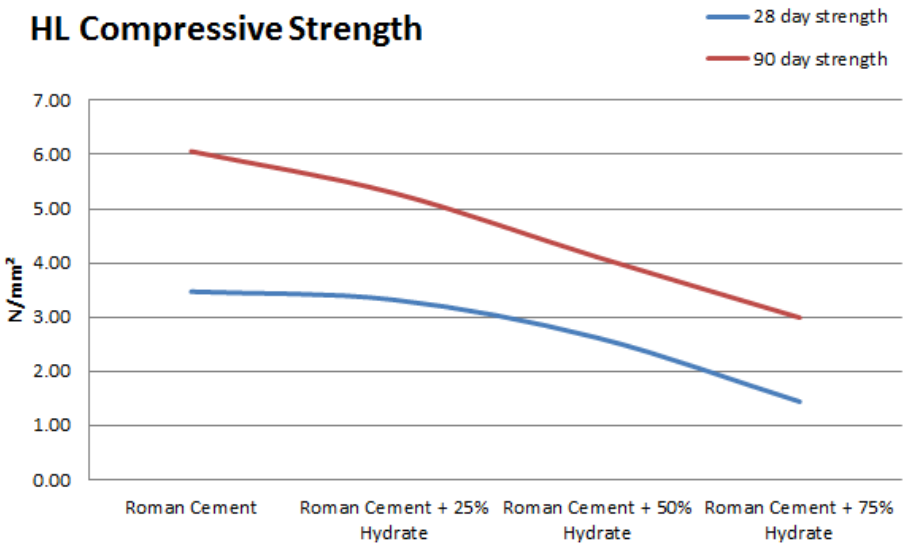
NRC can be used for bedding mortars, renders, plasters, grouts, and slurry/bonding coats.

- **NRC** has a better compatible strength with historic masonry and renders due to the special processing of the gault stone and the lower kiln temperatures used.
- **NRC** is suitable for conservation and new build projects where characteristics such as breathability, flexibility and colour are important.
- **NRC** can be blended with up to 2 parts lime; when mixed with the right aggregate it will produce a more flexible material with a vapour open quality which is similar to air lime.
- **NRC** has a unique buff colour which, unlike other cements, does not produce any grey tones.
- **NRC** is unique because it is cement without mineral or chemical additives to control the speed of set.

Compressive strengths using Natural Roman Cement (NRC) and Singleton Birch hydrated lime.

3Sample Ref	Bulk Density (kg/dm^3)	Water used for mortar (g)	28 day strength	90 day strength	365 day strength
Roman Cement	0.8976	225	3.47	6.06	9.20
Roman Cement + 25% Hydrate	0.6549	225	3.32	5.29	NT
Roman Cement + 50% Hydrate	0.4921	270	2.26	4.11	NT
Roman Cement + 75% Hydrate	0.4146	270	1.44	2.99	NT

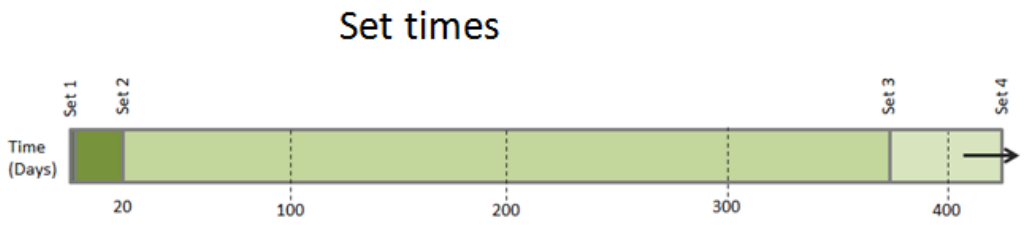
Test results from SB R&D accredited laboratories.



It is possible to see from this graph and data how a hydraulic lime can be created to the strength you desire by simply adjusting the mix. This table is also an interesting study on how binders in general might continue to strengthen beyond the recognised 28 day bench mark.

Typical blends: NRC-lime-well graded sharp aggregate

- **2-1-9**
- **1-1-6**
- **1-2-7**
- **1 NRC: 2.5 sand**



Set	Time to set	Details	Strength
Set 1	1-3 hours	Firm to touch	3 N/mm²
Set 2	2-3 weeks	Dormant for up to 3 weeks, during which it can still be crumbled between the fingers	6 N/mm²
Set 3	1 year	Full the potential for the task	9 N/mm²
Set 4	Final set	Undetermined period for the final strength	~15 N/mm²

Workable life of fresh mortar 60 minutes variable according to temperature. Vapour open qualities are determined by both aggregate and binder combination, seek advice from RCP Ltd Technical.

Below values according to BS EN 1015-19:1999

28 day flexural strength 1.58 MPa

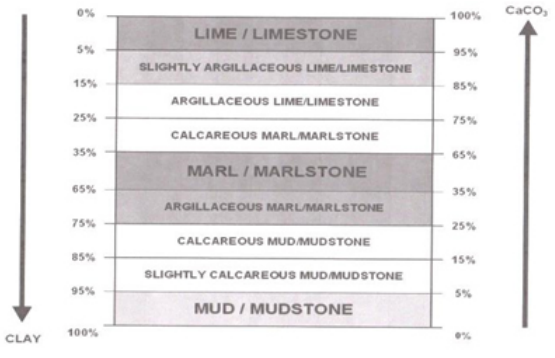
28 day compressive strength 3.09 MPa

28 day water absorption coeff 7.70 kg/m2/hr0.5

28 day water vapour permeability 0.96E-11, kgm-1s-1Pa-1

Some clarifications about the differences and similarities between the Natural hydraulic lime and Natural Cement are listed below.

Both the Natural Hydraulic Lime and Cement Natural are obtained by calcifying carbonate rocks composed essentially of limestone with varying amounts of silica (clay). Alumina, iron oxide, magnesia and sulfuric acid are also present in small quantities. Both products have hydraulic properties (provided by the clay content) which enables them to set and harden in the air and underwater to a lesser or greater extent.



Hydraulic lime is so called when the percentage of clay limestone is higher than 5% and always less than 17% -20%. By the amount of clay we can determine the classification (Feeble, moderate and eminently hydraulic). Thus, they are able to set in an environment saturated with moisture thanks to the proportion of silicates and calcium aluminates, but at the same time retaining an air set from CO2, to a greater or lesser extent, which allows the lime to carbonate.Hydraulic influences allow a reduction in the lime setting time and therefore will stabilize more quickly.

Unlike natural hydraulic limes, the percentage of clay limestone in natural cement is more than 20%. According to the process of production, two types of natural cements are available. These two

types of natural cements are:-

Natural Cement Fast Set: Obtained by crushing, burning and reducing the limestone marl to a powder.

Initial set time 5-15 minutes.

% clay content 26.7-40%.

28 day strength 3.46 MPa

(Absolute final strength assumed to be around 15-20 MPa*)

Naturally retarded Natural Cement: Obtained by crushing, burning, retarding and then reducing the marl limestone to a powder.

Initial set time 1-12 hours.

% clay content 21.8-26.7%

28 day strength 3.09 MPa

(Absolute final strength assumed to be around 10-15 MPa*)

The naturally retarded cement is generally the best option for conservation projects, this is due to the lower setting strength which will not be too brittle for the masonry mass when bedding, repointing or grouting.

* Absolute final strengths are at some undetermined time in the future.

Soft cement lumps in the bag are a natural feature of this product