

Sunlite is an off-white cement that can provide a wide range of attractive and distinctive architectural finishes for buildings, bridges, pavements and precast applications. Produced by Sunstate Cement Ltd. in Brisbane, Sunlite is a special purpose cement complying with AS 3972.

Sunlite is produced from a specially manufactured portland cement clinker that provides its unique colour. When combined with selected sands, aggregates and oxides, Sunlite provides an extremely diverse and architecturally satisfying range of finishes in brick and blockwork mortar, rendering, exposed aggregate pavements, panels, and terrazzo.

### Colour

The colour of concrete made with Sunlite will be influenced by the mix design, water content, and the colour of the fine aggregates.

For projects with a long construction period it is recommended to use sands that have an acknowledged colour consistency, or those which can be stock piled in sufficient quantities.

Slump consistency is essential for colour control. Concrete which fails to comply with the slump tolerances contained in AS 1379 should not be placed in areas where colour control is critical.

### Concrete Properties

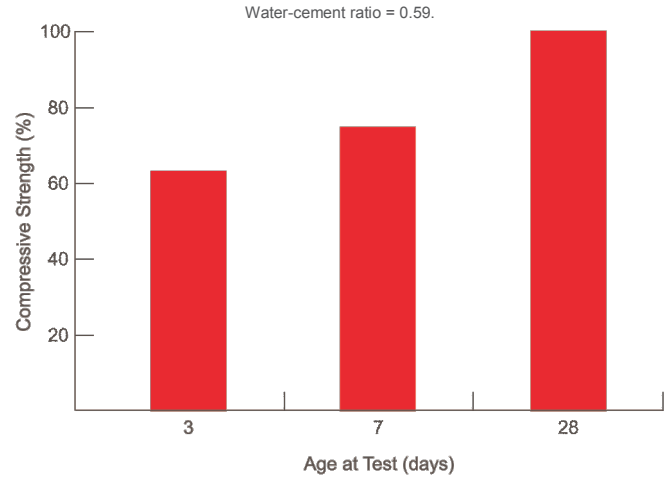
**Strength development.** The strength development of Sunlite is primarily dependent on the water-cement ratio. Graph One gives indicative data on the strength development of concrete containing Sunlite.

**Effect of excess water.** Use only the minimum amount of water to mix and place the concrete. Graph Two shows the reduction in compressive strength of concrete with increased water addition.

The porosity of concrete made with excess water is also increased resulting in a structure with less resistance to chemical attack.

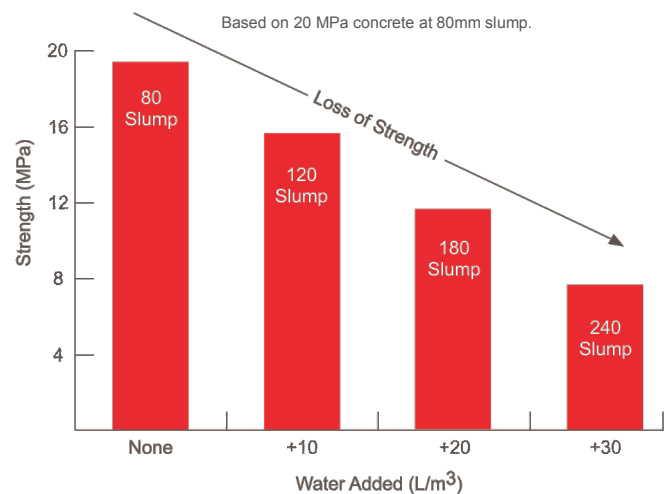
Other factors that affect the strength and durability of concrete containing Sunlite are:

- Concrete mix design, including admixtures
- Temperature (ambient and concrete)
- Entrained air content
- Compaction of concrete
- Curing



Note data is based on concrete mixes containing no admixture. Use of admixtures, flyash, etc. will alter the strength development characteristics of concrete containing Sunlite.

GRAPH ONE. Compressive Strength of Sunlite



Indicative representational only. Not to be used for calculation.

GRAPH TWO. Effect of Water Addition on Concrete Strength and Slump

### Concrete Mix Design

The cement content for each grade of concrete will depend on the nominated target strength and colour desired.

AS 3600 Concrete Structures recommends minimum strengths to achieve adequate concrete durability for various exposure classifications.

AS 1379 The Specification and Manufacture of Concrete is the relevant standard for the production and ordering of concrete.

For site mixed concrete the following mix proportions are suggested:

### Mix Proportions by Volume

Application	GP Cement	Stone or Gravel	Sand
High Strength & Watertight	1	3	1.5
General Use: Paths, Floors, etc.	1	4	2.5

**Mixing.** AS 1379 outlines requirements for material quality and mixing ready-mixed concrete. Recycled water may only be used where testing can demonstrate compliance with the relevant section of AS 1379. Dissolved salts and organic matter may adversely affect the strength, durability, set time and appearance of the concrete. Salt and organic matter in sand will have a similar detrimental effect.

**Placing.** AS 3600 outlines requirements for handling, placing and finishing concrete. Minimum cover to reinforcement is 20 mm for lowest exposure classification. The cover will need to be increased where concrete is cast against the ground, for fire resistance and for exposure classification other than A1.

**Curing.** A minimum curing period of seven days is recommended for all exposure classifications. Concrete should be maintained in a moist condition where practicable. Water sprays, wet sand or moisture retaining techniques, such as polyethylene sheets or curing compounds, have been used successfully. Curing should begin as soon as the selected technique allows.

In hot conditions aliphatic alcohol is recommended as a technique to mitigate plastic shrinkage cracking, however it is not a substitute for a proper curing regime. For normal concrete curing will result in a significantly higher compressive strength than concrete not subject to curing.

Curing also will affect other concrete properties including:

- Reduction in the potential for plastic cracking.
- Improvement in surface quality, durability, and impermeability.
- An improvement in abrasion resistance.
- Reduction in the carbonation rate.

Variations in the duration of curing or the uses of different curing methods may affect the initial colour of concrete.

### Mortar Properties

**Colour control in mortar.** For a light off-white colour the best results are achieved by the careful selection of a white bricklayer's sand plus lime. Coloured bricklaying sands may be used to produce some natural coloured mortars, e.g. creams to yellow.

Mix proportions must be kept consistent to minimise variations of colour. Sand, cement, and water quantities for each batch must be measured out using a bucket or other measuring device. Maintaining a constant water-cement ratio and sand-cement ratio is critical for colour control.

**Mix design.** Mortar must comply with the requirements of AS3700 Masonry Structures and is classified as M2, M3, or M4. The following table provides typical mix proportions (by volume) for the use of Sunlite for each mortar type.

Mortar Type	Sunlite	Hydrated Lime	Sand
M2	1	2	9
M3	1	1	6
M4	1	0.5	4.5

**Batching.** AS 3700 requires batching to be carried out using a bucket or other approved measuring device. Accurate measurement of each material, including water, is essential to produce a consistent product.

**Additives.** Hydrated lime is recommended to improve workability and to produce a lighter coloured mortar. If plasticisers are used they must be added strictly in accordance with the manufacturer's recommendations and be clear of any colouring. A serious loss of bond strength may occur if substitutions are used or products are overdosed.

### Cement Properties

The following table provides an example of some typical cement properties of Sunlite manufactured by Sunstate Cement Ltd.

Property	GP Cement	AS3972
Setting Time	Initial	1.15 hrs
	Final	2 hrs
Constancy of Volume (soundness test)	0 mm	≤ 5 mm
Fineness Index	500 m <sup>2</sup> /kg	
Compressive Strength (Mortar)	3 day	40.0 MPa
	7 day	49.0 MPa
	28 day	63.0 MPa

### Compatibility

Sunlite may be blended with other cements complying with AS 3972. It is also suitable to blend with flyash complying with AS 3582.1.

**Please note that blending other products with Sunlite is not recommended where colour control is required.**

Sunlite is compatible with admixtures complying with AS 1478. Some admixtures may affect the consistency of the concrete colour or cause staining. Refer to your admixture supplier for advice.

### Working Instructions

**Storage.** Contact with air and moisture will cause hydration of the cement and alter the cement properties. The 'shelf life' of Sunlite is therefore dependent on the storage conditions. Bagged product should be stored off the ground and stacked to allow free circulation of air. Bags are not waterproof. It is recommended that cement be retested prior to use if its age exceeds three months.

**Handling.** A Material Safety Data Sheet can be downloaded from [www.sunstatecement.com.au](http://www.sunstatecement.com.au) or by contacting Sunstate Cement Ltd. on Tel 07 3895 9890.

Sunstate Cement Ltd.  
Administration Tel 07 3895 9800 Fax 07 3895 9801  
Sales Tel 07 3895 9890 Fax 07 3895 9891  
Email [sales@sunstatecement.com.au](mailto:sales@sunstatecement.com.au)  
8 Bulk Terminals Drive Port of Brisbane Qld 4178  
PO Box 350 Wynnum Qld 4178  
[www.sunstatecement.com.au](http://www.sunstatecement.com.au)

For more information about Sunstate Cement Ltd. and its products, please visit the Sunstate Cement website at [www.sunstatecement.com.au](http://www.sunstatecement.com.au) or email [sales@sunstatecement.com.au](mailto:sales@sunstatecement.com.au).

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