



Blended Cement





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Blended Cement is manufactured for use in general purpose concrete applications, cement-based products, mortars and grouts where the use of fly ash has been approved. Concrete made with fly ash or slag cement delivers improved later-age strength workability and enhances the durability performance of concrete. Additionally, fly ash and slag are recycled by-products of industry, the use of these in cement blends assists with reducing carbon emissions.

Blended Cement is a uniform blend of Portland cement and fly ash or slag that complies with the requirements specified in Australian Standard AS 3972 for Type GB (Blended) cement. It also complies with the AS 3972 requirements for Type SL (Shrinkage Limited) and Type SR (Sulfate Resisting) cements.

Benefits of Blended Cement

Cements blended with fly ash when incorporated into a concrete mix can be expected to provide the following benefits;

- Improved workability and pumpability
- Reduced water demand
- Enhanced bleed control
- Lower drying shrinkage and creep
- Improved resistance to sulfate attack and chloride penetration
- Reduced potential for Alkali Aggregate Reaction

Product applications

The versatility of blended cement makes it an ideal choice for a wide range of applications including:

- Domestic construction
- Major engineering projects
- Pre-cast concrete where high durability and off-form finish are required
- Stabilisation including pavement recycling for road construction
- Mining applications
- Specialist formulations such as adhesives, renders, mortars and grouts

General Blend Cement delivers improved workability and later-age strength and enhances the durability performance of concrete.

Where specific properties such as rapid setting or high early strength are required a more specialised cement should be considered.

Type GB Cement Properties

The following table details the relevant specified requirements of AS 3972 and the indicative values achieved by General Purpose Blended Cement.

Property		AS3972 - 2010 Type GB	Indicative GB
Setting Time	Min	45min	100-130 min
	Max	10 hrs	3.0 - 4.0 hrs
SO ₃	Max	3.50%	< 2.5%
ISO Mortar Compressive Strength	3 Day (min)	–	20-32 MPa
	7 Day (min)	20 MPa	29-41 MPa
	28 Day (min)	35 MPa	44-58 MPa
Expansion (in Sulfate solution)	16 week (max)	750µS	200 - 500µS
Shrinkage (mortar)	28 day (max)	750µS	400 - 550µS

All testing is conducted in accordance with the relevant Australian Standard test methods, at a NATA registered laboratory.

General Purpose Blended Cement is primarily a Type GB cement but also meets the requirements of AS3972 for classification as both Shrinkage Limited (Type SL) cement and Sulfate Resisting (Type SR) cement. However use of this product does not guarantee sulfate resistant or low shrinkage concrete as there are other factors which may influence concrete performance including cementitious content, water to cement ratio; compaction and curing as well as aggregate type. Further advice should be sought on the use of this product where high performance requirements exist.

Compatibilities

Type GB Cement is compatible with:

- Admixtures that comply with AS 1478 – Chemical Admixtures for Concrete.
- Fly ashes complying with AS 3582.1 – Supplementary Cementitious Materials for Use with Portland cement: Fly ash.
- Ground granulated blast furnace slags complying with AS3582.2 - Supplementary cementitious materials for use with Portland cement: Slag - ground granulated Iron blast-furnace.

- Amorphous Silica complying with AS3582.3 - Supplementary cementitious materials for use with Portland cement: Amorphous silica.
- Other cements complying with AS3972 - Portland and blended cements.

Caution: General Purpose Blended Cement must not be mixed with high alumina cement as it may result in uncontrollable expansion and setting times.

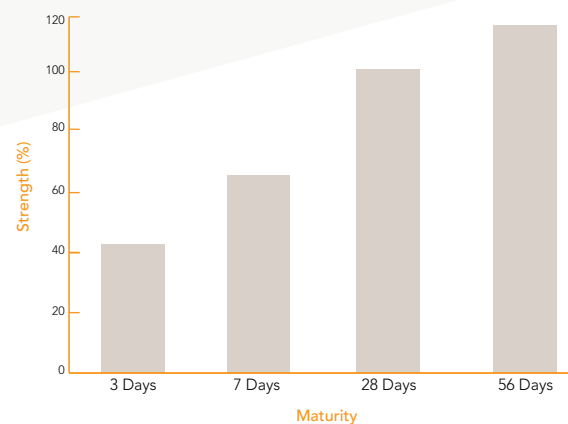
Mix Design

The proportioning of constituent materials in a concrete mix is a complicated matter which can be influenced by many factors. We recommend that trials be conducted with the available materials, to ascertain optimum cement contents for specific classes of concrete. For further guidance on this issue please refer to AS1379 – The specification and manufacture of concrete and AS3600 – Concrete structures.

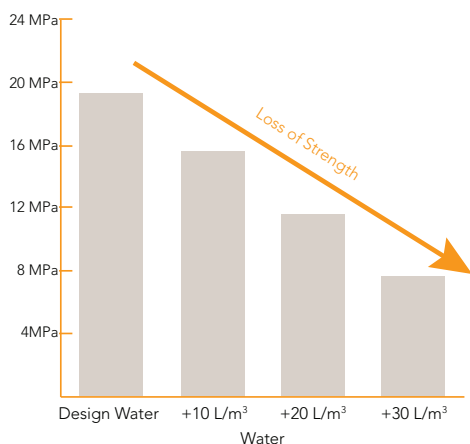
Concrete Properties

Compressive Strength Development

Compressive strength development in Portland cement concrete is affected by a number of factors such as the physical and chemical properties of the cement, water cement ratio, admixtures, curing and environmental conditions. The following graph depicts the indicative compressive strength development of General Purpose Blended Cement concrete over time.



Effect of Excess Water Addition on Concrete Compressive Strength



Workability/Setting Times

Concrete produced with an Type GB cement may require less water to achieve a specified level of workability when compared to concrete produced with a Type GP cement. Concrete setting times may be extended when using Type GB cement.

Curing

A minimum curing period of seven days is recommended for all exposure classifications. Concrete should be maintained in a continually moist condition wherever practicable. Water sprays, wet sand or moisture retaining techniques, such as clear polyethylene sheets or curing compounds are recommended.

Curing should begin upon the completion of surface finishing or in accordance with manufacturers instructions where proprietary curing compounds are used.

For normal class concrete, curing can produce a compressive strength up to 100% greater than concrete not subjected to curing. Water application or moisture retaining curing is more effective for lower grades of concrete. Curing will also beneficially affect other concrete properties including:

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

Mortar/Render Mix Proportions

Blended Cement is suitable for use in brick mortars and wall renders. The following table gives a guide to the proportions (by volume) to be used (Note: This information is a guide only, specific advice for your project should be obtained for the materials you are using.)

Material	GB	Sand	Lime
High Durability Mortar (eg retaining walls)	1	3	0 - 0.2
Maximum Bond Mortar (eg structural brickwork)	1	4.5	0.2 - 0.5
General Purpose Mortar	1	6	1
Wall Render	1	3	0

Additives such as air entrainers, thickening agents or plasticisers can be used but should always be used in accordance with the manufacturers recommendations.

For further information

Please contact Cement Australia's Customer Support Services:

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Storage, Handling and Safety

The 'shelf life' of Portland cement products is dependent on the storage conditions. It is recommended that Portland cement products be re-tested prior to use if the age of the cement exceeds three months.

Portland cement products are highly alkaline materials and are significantly affected by exposure to water. Full Safety, Storage, Handling and Disposal information is available in the specific product Material Safety Data Sheet available on www.cemaust.com.au

Product Disclaimer

The information contained in this sheet is for general guidance only and should not be relied upon in specific instances. Cement performance results quoted are indicative as cement performance can be heavily influenced by a wide range of factors beyond our control. Users should rely on professional advice according to their particular circumstances. To the extent permissible by law Cement Australia will not be liable for any losses due to reliance on the information in this sheet or for losses due to the misuse of its products.

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