

Uniclass L621	EPIC F2111	Feb 08
CI/SfB	Eq2	

Castle Cement is manufactured to comply with the requirements of BS EN 197-1 : 2000 CEM II/B-V Portland-fly ash cement strength class 32,5R.

Castle uses the most efficient dry-process kilns to manufacture cement, the benefit of which includes lower energy consumption. These burn up to 60% recycled and non-fossil fuels and use waste as a source of raw material – all of which would otherwise go to landfill or incineration. Castle is the lowest emitter of carbon dioxide per tonne of cement in the UK and is committed to further reductions into the future.

Cement is a CEM II cement which enhances sustainability through the use of carefully selected recycled raw materials, further reducing the carbon footprint of the cement.

Applications

Cement is recommended for general purpose use in concrete, mortar, render and screed.

Cement is compatible for use with a wide range of admixtures to extend further the properties and uses of mixes, but it is strongly recommended that trial mixes are carried out to determine optimum proportions.

Characteristics

Improved chemical resistance.

Lower water demand than Portland cement (CEM I) mixes.

Improved chloride resistance.

A reduced alkali content - declared mean equivalent $\text{Na}_2\text{O}(e)$ of less than 0.6%.

The colour may be darker than Portland cement (CEM I).

Quality

Cement is produced using carefully selected raw materials. Strict quality control throughout each stage of the manufacturing process ensures that a consistent final product is achieved.

Cement is CE marked under the European Union system of conformity evaluation which provides independent third party certification of product conformity. It confirms that in addition to applying a system of factory production control (defined in BS EN 197-2 : 2000), independent sampling and testing of the cement has confirmed its compliance with all of the requirements of BS EN 197-1 (see Quality Assurance).

Technical information on the quality of Cement is available to customers on request from Castle's Technical Helpline on 0845 722 7853. Reports of tests providing data on fineness, setting times, soundness, chemical composition including alkali levels and compressive strengths of mortar prisms, are available.

Strength

The strength requirements of concretes, mortars, renders and screeds are widely varied and Cement is designed to be adaptable in performance to accommodate the requirements of all of these applications. For a limited range of applications a minimum compressive strength may be required. In such cases the quantity of Cement in the mix will have to be determined through trial mixes using the proposed materials.

Guide to mix design

Cement in concrete

Cement is suitable for use in a wide range of concretes. Optimum performance in terms of strength and durability is achieved in concrete when the water content is kept as low as possible consistent with ensuring satisfactory placing and thorough compaction.

Other factors affecting strength include conditions of curing as well as the individual properties of the constituent materials and their proportions in the mix.

The potential strength of any Portland cement based product will only be best developed under saturated conditions. Loss of any water to the surroundings should be guarded against and for a period of at least seven days precautions should be taken to keep the concrete moist and to prevent premature drying. The rate of strength development will depend on ambient conditions and the initial temperature of the mix. As a general rule, concrete should be placed within the range of 10°C to 30°C. In cold weather, freshly poured concrete should be protected against frost to avoid damage. At higher temperatures there is increased risk of loss of water by evaporation, cracking caused by thermal stresses and reduced ultimate strength. For further information on mixes for specific uses see BS EN 206-1 and BS8500.

Suitable mixes for Cement in concrete

Material	Proportions by volume	Yield per 25kg bag of cement	Batch weights per cement bag	Batch weights for 1m ³ (approx)
General purpose mix – For most uses except for foundation work and outdoor paving				
Cement	1	0.08m ³	25kg	12.8 bags
Concreting sand	2		55kg	680kg
20mm aggregate	3		90kg	1175kg
(combined aggregates)	(4)		(145kg)	(1855kg)
Foundation mix – For footings, foundations and bases for precast paving				
Cement	1	0.09m ³	25kg	11.2 bags
Concreting sand	2.5		65kg	720kg
20mm aggregate	3.5		105kg	1165kg
(combined aggregates)	(5)		(170kg)	(1885kg)
Paving mix – For all exposed in-situ paving, e.g. for pool surrounds and driveways*				
Cement	1	0.06m ³	25kg	16 bags
Concreting sand	1.5		40kg	600kg
20mm aggregate	2.5		75kg	1200kg
(combined aggregates)	(3.5)		(115kg)	(1800kg)
* It is recommended that proprietary air-entraining agent is added in accordance with manufacturers recommendations to improve durability.				

Concrete mix design needs to be varied to suit individual circumstances. Where there are special needs Castle Technical Services department will be able to advise on the design of appropriate mixes. Please call Castle's Technical Helpline on 0845 722 7853.

Cement in mortars

Cement is suitable for use in mortars. Mortars must be designed to give the correct strength for the application. An unnecessarily strong mortar will concentrate the effects of any differential movement between the mortar and the brickwork leading to cracking and reduced durability and resistance to rain. A properly designed mortar will accommodate some differential movement and if cracking does appear will generally ensure that it is distributed as hairline cracks in the joints without affecting the integrity of the bricks themselves.

Suitable mixes for Cement in mortars

Designation/use	Cement: Building sand* (by volume)
I Conditions where strong dense mortar is essential (e.g. where heavily loaded and some classes of work below ground level)	-
II Work in severe conditions of exposure to weather; work below DPC	1: 3-4
III Normal construction	1: 4-5
IV External work above DPC, if not carried out in winter	1: 7-8
* Small amounts of air-entraining mortar plasticiser may be necessary.	

Cement in rendering

Cement is suitable for use in all types of renders. Care should be taken to ensure that the surface to be rendered is clean and free from dust. Mixes for successive coats should neither be stronger nor thicker than the previous coat. Each coat should be allowed to cure for several days before a subsequent coat is applied.

Suitable mixes for Cement in rendering

Mix type	Uses	Yield per 25kg bag of cement m ² /10mm thick (approx)	Cement: Rendering sand* (by volume)
II	First coat – strong backgrounds and metal lathing. Roughcast and dry-dash	7.5m ²	1: 3-4
III	First coat – moderate backgrounds Second coat – strong backgrounds	10m ²	1: 4-5
IV	First coat – weak backgrounds Second coat – moderate and weak backgrounds	12.5m ²	1: 7-8
* Small amounts of air-entraining mortar plasticiser may be necessary.			

Cement in screeds

Cement is suitable for floor screeds. When mixing screeds ensure that the correct water content is used so that it will hold together without crumbling when pressed into a ball. A pan type of mixer is recommended as most efficient for low water mixes of this type. Precautions should be taken to ensure that water is not lost from the mix before placing and that after compaction the work is covered with plastic sheeting for at least seven days to prevent premature drying out. Newly laid screed should be protected from frost.

Suitable mix for Cement in screed


Material	Proportions by volume	Yield per 25kg bag of cement	Batch weights per cement bag	Batch weights for 1m ³ (approx)
Cement	1	0.06m ³	25kg	16 bags
Dry screeding sand	3.5	-	112.5kg	1800kg

Admixtures and additions

Cement is compatible with a wide range of air-entraining agents and workability aids. It is strongly recommended that trial mixes are carried out to determine optimum proportions.

Environment

Cement is a reduced CO₂ cement.

REDUCED ENVIRONMENTAL IMPACT	
	• SUSTAINABLE FUELS ✓
	• ENERGY EFFICIENT PRODUCTION ✓
	• ENVIRONMENTAL MANAGEMENT SYSTEM ✓
	• 25% RECYCLED CONTENT ✓

Shelf life

Cement is compliant with the Chromium (VI) Directive and should be used within the declared shelf life shown on the bag.

Availability

Available in 25kg bags.

For further information please contact:

Castle Cement Limited
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Birmingham B37 7YN

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Please note: Reference to a Technical Standard number in this leaflet is deemed to include the latest published edition and/or any published amendments issued after the standard's publication, unless a date of issue is quoted in which case reference is to the provisions stated in that edition.

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