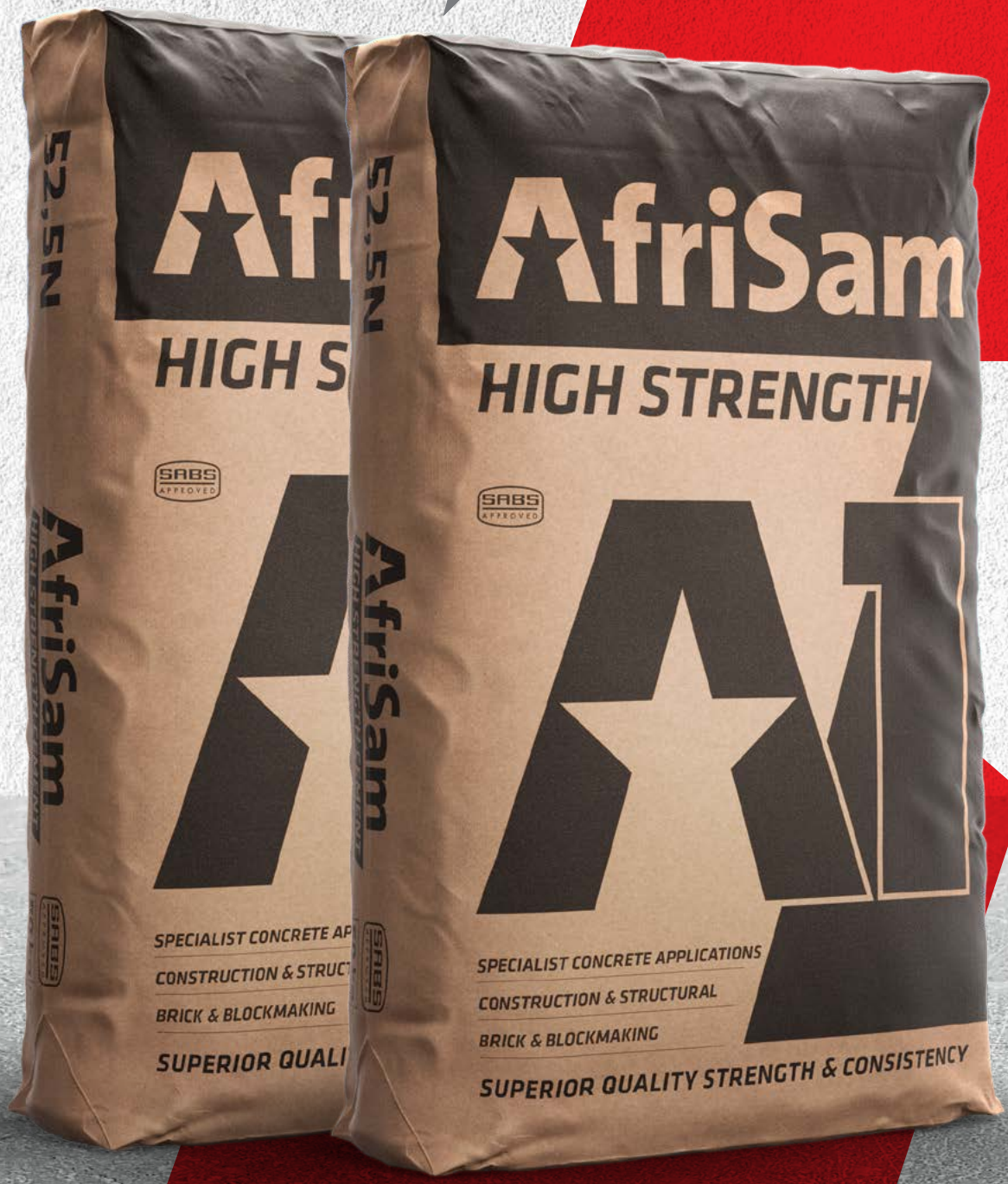
HIGH STRENGTH CEMENT

ASK FOR AFRISAM



AfriSam High Strength Cement

A masterpiece of cement engineering

AfriSam High Strength Cement (HSC) is a specially developed composite cement for use in applications where high early strength is required. It possesses the following properties:

- Is ideal for use by concrete product manufacturers for Readymix or site-batched concrete to produce a wide range of cost-effective solutions.
- It achieves high early strength which saves time on site.
- It contains mineral components which improve the durability of concrete and is especially useful under aggressive conditions.
- It has a high workability, strength and durability.

AfriSam quality guaranteed

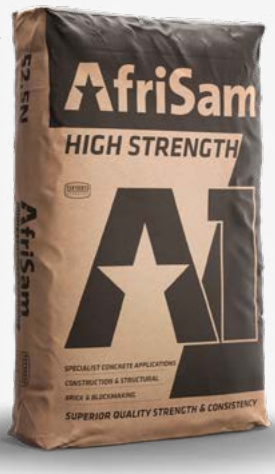
AfriSam stakes its reputation on consistently high quality products and our High Strength Cement is no exception.

- AfriSam manufacturing facilities are ISO 9001 certified.
- We have the highest possible Quality Management Systems.
- AfriSam High Strength Cement fully complies with the SANS 50197 cement specification for common cements.
- The composition of the cement is constantly monitored and maintained to guarantee high quality performance in its strength class.

The choice for every job

AfriSam High Strength Cement offers consistent strength, workability and durability, making it ideal for the following applications:

- Brick and block making.
- Reservoirs.
- Precast operations.
- Structural concrete.
- Shotcrete.
- Mining applications.



Performance

Table 1: Typical performance in relation to SANS 50197-1 criteria

Physical properties	SANS 50197-1	CEM I* Class 52,5 N	CEM II A-M (V-L) Class 42,5 R
Initial set, minutes	>60	145	160
Soundness, mm	<10	1	0
ISO mortar prism strength results			
Early strength at 2 days, MPa	≥20	25	24
Strength at 28 days, MPa	≥42,5 ≤62,5		53
Strength at 28 days, MPa	>=52,5	54	
Chemical testing			
Sulphate (SO_3) content, %	≤3,5	2,8	2,5
Chloride (Cl-), %	≤0,1	≤0,1	≤ 0,1
Typical concrete strength at a w:c of 0,67			
1-day, MPa	-	11,5	13
7-day, MPa		26	27
28-day, MPa		32	38

*52,5 N produced at AfriSam Ulco only

Table 2: Typical chemical composition

Physical characteristics	
Relative density	3,05
Loose bulk density when fluidised	1 100 kg/m^3
Loose bulk density after consolidation	1 500 kg/m^3

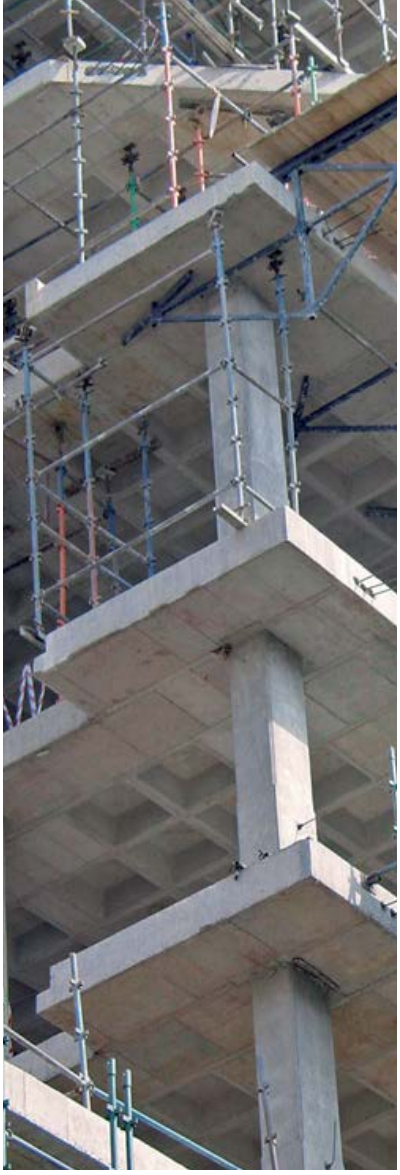


Table 3: Typical chemical composition

Chemical compound (as a percentage by mass – ignited basis)	High Strength Cement	
	CEM I	CEM II A-M (V-L)
Loss on ignition	7,2	2,4
SiO_2	20,4	25,0
P_2O_5	0,07	0,10
Al_2O_3	4,2	9,0
Fe_2O_3	2,4	2,9
CaO	64,8	56,8
MgO	2,5	1,6
K_2O	0,8	0,5
TiO_2	0,3	0,6
Na_2O	0,1	0,1
SO_3	2,8	2,5
Mn_2O_3	1,1	0,1

Production

The overall strength of the concrete is significantly influenced by the quality of the sand. Where possible, single-sized sands and sands with excessive fine material should not be used.

Machine mixing

Machine mixing is carried out by a machine, the common types being non-tilting, tilting, reversing drum, split drum, horizontal shaft and pan mixer.

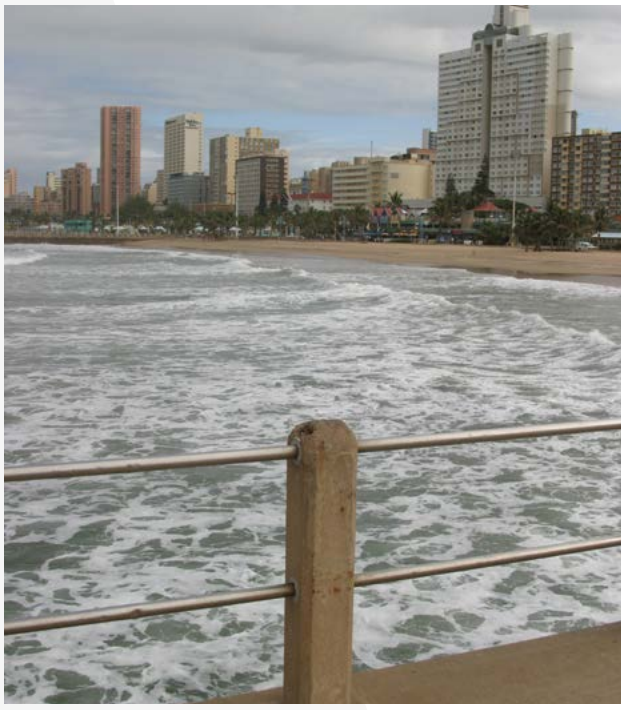
- Materials have to be loaded in a specific sequence to minimise the mixing time, with each mixer having its own established mixing time which includes time to charge, mix and discharge the mixture.
- Under-mixing can increase the variability of the concrete from a workability and strength perspective, but over-mixing has minimal effect.
- Mixing should be done until the concrete is of uniform consistency, colour and texture. All batches should be inspected visually prior to being released.
- Empty the mixture completely after each batch.
- Clean the mixer thoroughly after each batch.

Adjusting mixes on site

The mix proportions are calculated using average materials. Check the first batch of concrete. If the concrete is difficult to compact and it is not possible to achieve a smooth finish, the mixture is probably too stony. If the mixture is too sandy, the wearing properties of flat slabs may be reduced.

Concrete is too stony if stones protrude above the surface when the concrete surface has been floated. In this case, reduce the stone volume by half a wheelbarrow and increase the sand by a similar amount.

If a thickness of mortar of more than a few millimetres is available at the surface when concrete is floated, the concrete is too sandy. In this case, increase the stone content by half a wheelbarrow and decrease the sand by the same amount.



Guide to the use of High Strength Cement

High-strength concrete

30MPa (nominal at 28 days)

Suitable for suspended structural beams and slabs, precast items such as flagstones and heavy-duty floors such as workshop floors. 1 part AfriSam High Strength Cement + 3 parts coarse sand + 3 parts stone. To make a mix for 1 cubic metre of high-strength concrete you will need: 6,59 bags of AfriSam High Strength Cement + 0,64 cubic metres of coarse sand + 0,64 cubic metres of stone. Allow an additional 10% of required quantities for wastage.

Batching by bucket

High Strength Cement	Coarse sand	Stone	Approximate yield
1 bucket	3 buckets	3 buckets	4½ buckets

Batching by wheelbarrow

High Strength Cement	Coarse sand	Stone	Approximate yield
2 bags (1=50kg)	3 wheelbarrows	3 wheelbarrows	0,3m³

Quantities per m³ of concrete

High Strength Cement	Coarse sand	Stone	Approximate yield
6,59 bags (1=50kg)	0,64m³	0,64m³	1m³

Ultra high-strength concrete

45MPa

Suitable for suspended structural beams and slabs, columns and water-retaining structures. 1 part AfriSam High Strength Cement + 2½ parts coarse sand and 2½ parts stone. To make a mix for 1 cubic metre of ultra high-strength concrete you will need 7,7 bags of AfriSam High Strength Cement + 0,63 cubic metres of coarse sand + 0,63 cubic metres of stone. Allow an additional 10% of required quantities for wastage.

Batching by bucket

High Strength Cement	Coarse sand	Stone	Approximate yield
1 bucket	2½ buckets	2½ buckets	4½ buckets

Batching by wheelbarrow

High Strength Cement	Coarse sand	Stone	Approximate yield
2 bags (1=50kg)	4 wheelbarrows	4 wheelbarrows	0,39m³

Quantities per m³ of concrete

High Strength Cement	Coarse sand	Stone	Approximate yield
6,59 bags (1=50kg)	0,67m³	0,67m³	1m³

Water usage

Only use sufficient water to make the mixture workable. Excessive water use results in reduced strength.

Retempering

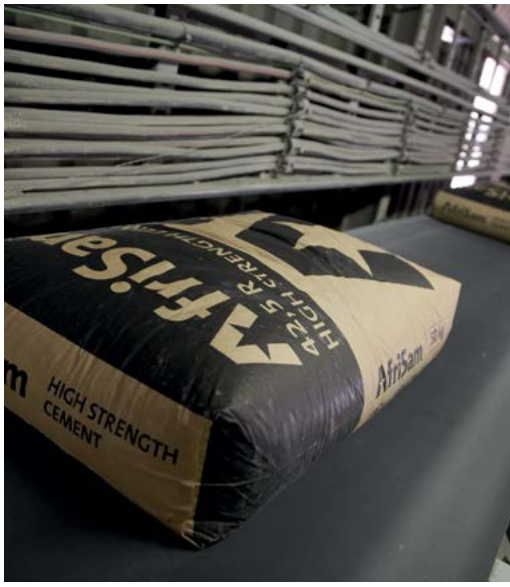
All mixes should be used within a maximum of two hours after being mixed and must never be retempered by mixing in additional water, as this reduces the resultant strength of the mix.

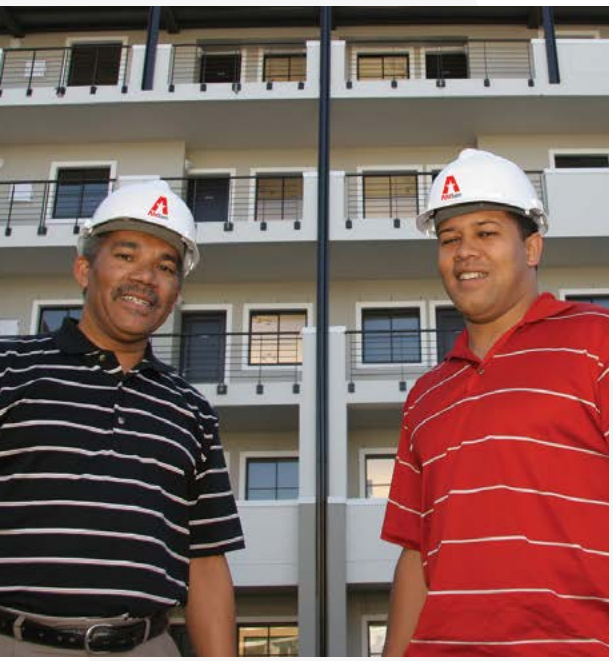
Curing

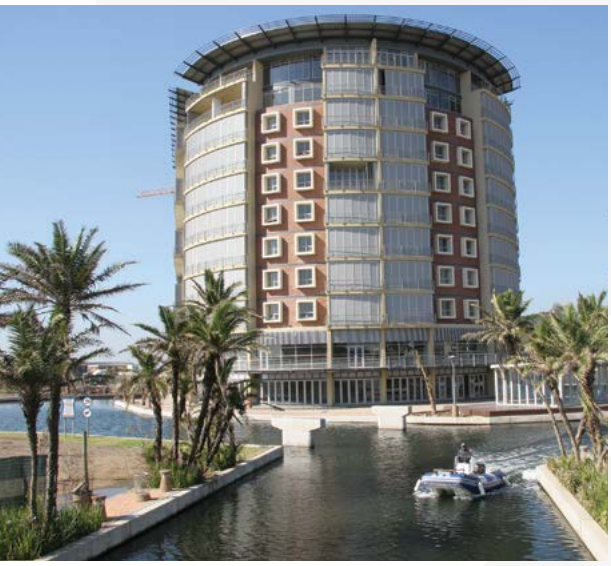
After your concrete, mortar and plaster work has been completed, it is essential to protect it from the sun and wind by covering it with a plastic sheet, damp sand or hessian and to keep it moist for a minimum of 7 days.

Cold weather - CAUTIONARY NOTE

All cements gain strength at a slower rate at low temperatures and concrete, mortar and plaster must be protected from freezing.







AfriSam High Strength Cement

Tips for storage

- Store in a dry enclosed area.
- Store off the floor on a wooden pallet or plastic sheeting to prevent moisture absorption.
- Keep doors and windows closed to eliminate airflow.

Health and safety

Occupational exposure limits to cement are recommended in the Occupational Health and Safety Act and summarised as follows:

- The recommended limit for total inhalable dust is 10mg/m³, and the respirable recommended limit is 5mg/m³.
- Direct skin contact for extended periods can result in severe burns.
- Suitable attire should be worn to prevent dust inhalation and direct skin contact.

A detailed Safety Data Sheet is available on request.

Client support

Behind every bag of cement is AfriSam's unique and highly-developed sales support, technical service and supply infrastructure. This is to ensure that each of our customers can rest assured that every bag is of the highest quality. Our fully-equipped laboratory is run by qualified technicians who are ready to assist with specific requirements.

AfriSam is committed to sustainable development

AfriSam is committed to sustainable development and, as such, we strive towards:

- Legal compliance at all times.
- Optimal use of natural resources.
- Waste reduction.
- Reduced use of fossil fuels.
- Minimising environmental degradation and pollution.
- Employee training and stakeholder engagement.

CO_2 rating

To enable consumers to make informed purchase decisions, all AfriSam bags now reflect the carbon rating of each product.

Delivering on quality in a responsible way

Through our commitment to sound environmental stewardship, we offer high quality products and customer peace of mind.

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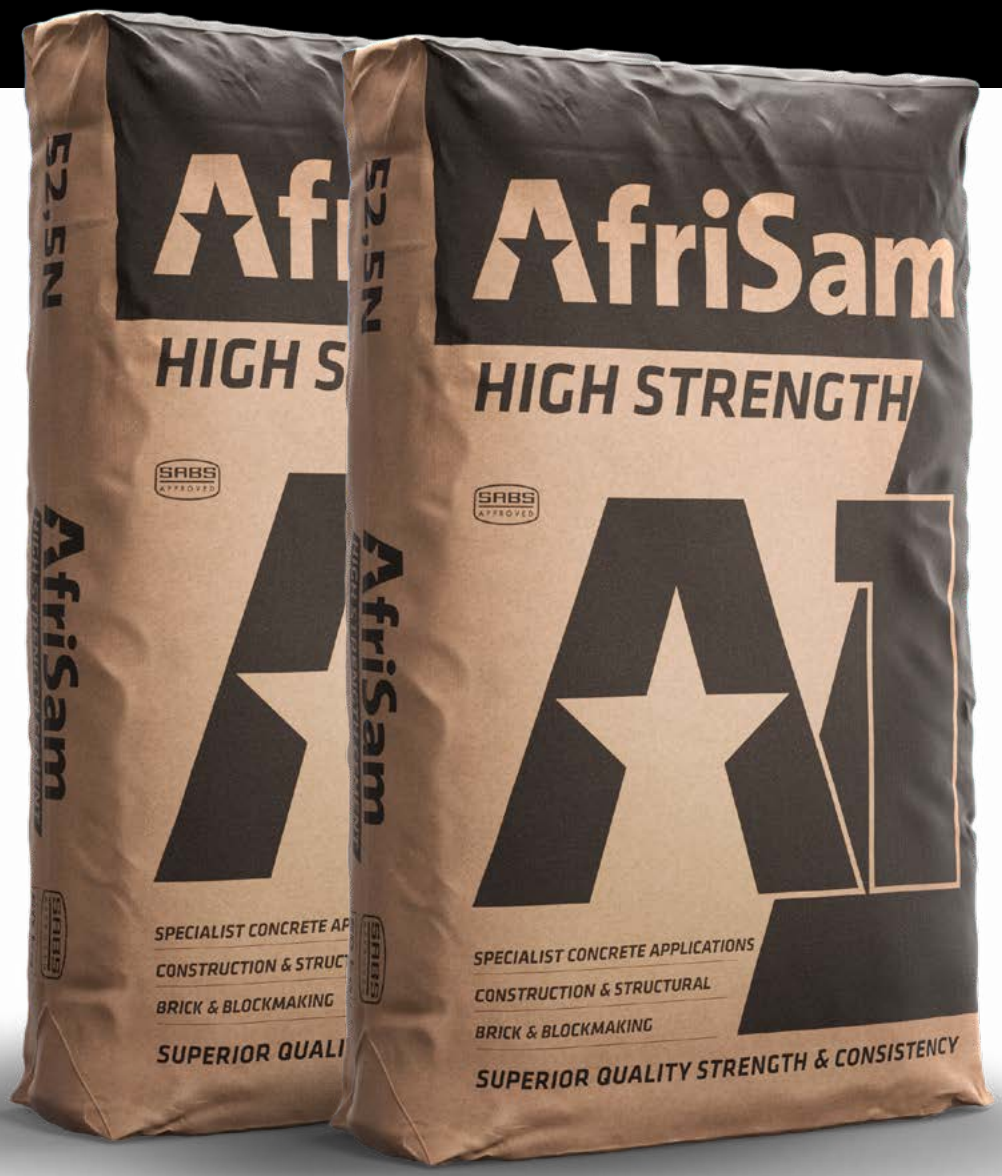

OUR **QUALITY PROMISE**

AfriSam's commitment to superior performance gives customers the peace of mind that comes with guaranteed technical excellence, top quality products, sustainability and continuous innovation.

CO_2
Reducing our Carbon Footprint

With the planet as one of our core values, we assess the carbon footprint of each and every one of our operations and products while actively striving to drive down our impact on the environment.

23/12/2021