

Concrete Aggregate

Aggregate - product brochure



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Product Overview:

The concrete aggregate product range covers all aggregates used in the manufacture of concrete.

Material specifications

- When batching concrete, one should ensure that the aggregate does not contain any deleterious material, as this can have a negative affect on the mix.
- One should also be aware that the water demand of the fine aggregate is very important in ensuring the control of cement content in the mix.

AfriSam aggregates comply to specifications as listed in the following tables.*

Concrete aggregate properties and requirements (coarse aggregate).

Gradient limits, dust content, flakiness index, 10% FACT value and aggregate crushing value									
Property	SABS Requirements								
Grading limits, % (m/m) passing sieve sizes, mm	Normal aggregate size mm								
	75,0	53,0	37,5	26,5	19,0	13,2	9,5	6,7	
75,0	100	100							
53,0	0 - 50	85 - 100	100						
37,5	0 - 25	0 - 50	85 - 100	100					
26,5	0 - 5	0 - 25	0 - 50	85 - 100	100				
19,0		0 - 5	0 - 25	0 - 50	85 - 100	100			
13,2			0 - 5	0 - 25	0 - 50	85 - 100	100		
9,5				0 - 5	0 - 25	0 - 55	85 - 100	100	
6,7					0 - 5	0 - 25	0 - 55	85 - 100	
4,75						0 - 5	0 - 25	0 - 55	
2,36							0 - 5	0 - 25	
1,18								0 - 5	
Dust content, % (m/m), maximum	2,0								
Flakiness index, %, maximum	35								
10% Fact value, Kn, minimum	110 for aggregates used in concrete subject to surface abrasion, and for structural elements of reinforced concrete and prestressed concrete 70 for aggregates used in concrete not subject to surface abrasion								
Aggregate crushing value, %, maximum	29								
*Material passing 0,075 mm sieve					from SABS 1083:1994 table 2				

Concrete sand properties and requirements (fine aggregate)

Grading limits, dust content and fineness		
Property	SABS requirements	
	Natural Sand	Crushed Sand
Grading Limits, (%m/m), passing sieve sizes, mm 4,75 0,150	90 - 100 5 - 25	
Methylene blue absorption value, maximum	0,7	
Clay content, **% m/m, maximum	2,0	
Dust content, % m/m, maximum	5	10
Fineness modulus	1,2 - 3,5	
*Material passing 0,075 mm sieve	from SABS 1083:1994 table 1	
**Material smaller than 5 µm		

Notes:

The limits for dust content may be increased to 10% and 20% respectively provided that the fine aggregate complies with the requirements for:

- Methylene blue absorption value, or
- Clay content (minus 5 µm material).

Sampling concrete aggregate

It may be necessary for concrete aggregates to be assessed. The following notes are intended as a guide to correct sampling. It is important to remember that incorrect sampling may lead to invalid results.

Bulk sample

A bulk sample size is determined by the aggregate size according to predetermined quantities specified by SABS. Sampling may be done in accordance with the following procedures:

Aggregate in stockpile:

Take at least 10 increments from different parts of the stockpile, working from the bottom of the stockpile upwards. Avoid sampling in segregated areas or from the surface.

Aggregate in bins or bays:

Take at least eight increments evenly spaced over the area. Before taking the increments, remove and discard 100 to 150 mm of material from the surface.

Aggregate in vehicles:

Dig a trench across each of three approximately equal sections, at least 300 mm deep and approximately 300 mm wide. Take four increments equally spaced from the bottom of each trench, pushing the shovel down vertically.



Moving belt conveyor:

Stop the conveyor and remove approximately 1 m length of aggregate across the width of the belt.

If the mass of the bulk sample is not more than 50 kg, it may be placed in a suitable container, labelled and despatched to the appropriate laboratory. If the mass of the bulk sample is more than 50 kg, it must be reduced in size as described under laboratory sample.

Laboratory sample:

Two sampling methods may be used to obtain a valid laboratory sample:

- Coning and quartering
- Riffing

These methods should be followed accurately to ensure a representative sample. Once the sample is obtained, place in a clean, dust free plastic bag, metal or canvas container, secure and label clearly.

Impurities related to aggregate:

Impurities in the aggregate may negatively affect the mix or strength of your concrete. Aggregate may be tested for the following impurities.

Organic impurities:

The colour of the liquid above the fine aggregate shall not be darker than the colour of the reference solution. This requirement shall not be mandatory if the fine aggregate complies with the requirement for soluble deleterious impurities. (SABS 832;1994)

Presence of sugar in natural sand:

Fine aggregate should be free from sugar unless it complies with the requirement for soluble deleterious impurities. (SABS 833;1994)

Soluble deleterious impurities in natural sand

Only mandatory when the sand fails to comply with either or both of the requirements for organic impurities and freedom from sugar. The strength of mortar made with the fine aggregate shall not be less than 85% of that of mortar made with the same fine aggregate after thorough washing. (SABS 834;1994)

Chloride content

Sand for:	Cl % (m/m), maximum
Concrete for prestressing	0,01
Normal reinforced concrete	0,03
Non - reinforced concrete	0,08

from SABS 1083:1994 table 1

Shrinkage in aggregate

Drying shrinkage is the term given to the contraction which takes place in concrete (or mortars or grouts) when water is removed or lost from within the structure of the hardened concrete.

The magnitude of shrinkage is time-related and is largely dependent on the physical structure (porosity) of the cement paste and on the rate and extent to which the water leaves the concrete. Factors affecting cement paste porosity and/or water loss will therefore also affect shrinkage. Some of these factors are listed as follows:

- Aggregate type
- Type of binder
- Cement characteristics (such as gypsum content and alkali content)
- Total cementitious content
- Water : cement ratio
- Degree of hydration or cementing reaction
- Total water content of the fresh concrete
- Environment and exposure conditions of the concrete
- Surface : volume ratio of the concrete as affected by shape and size of elements

(Extracts taken from "Shrinkage" by Nick Doulgeris)

Note: All SABS specifications will be replaced by SANS specifications, but the data contained therein will remain constant.

Note: All typical gradings and water demands may be obtained, on request, from the product technical department.

***Note: As members of ASPASA (Aggregate & Sand Producers Association of South Africa) we comply with COLTO specifications except where amended by ASPASA.**



Aggregate Quarry Locations

Gauteng	KwaZulu-Natal
Eikenhof	Coedmore
Ferro	Ladysmith
Jukskei	Newcastle
Olifantsfontein	Pietermaritzburg
Roodekrans	Umlaas
Rooikraal	Verulam
Vogels	
Zeekoewater	Western Cape
	Peninsula
	Philippi (Depot)
	Rheebok

Contact the regional office in your area for Sales or Technical Services or any other information.

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