

The correlation between Compressive Strength and Tensile Splitting Strength



Technical Note

What is the correlation between compressive strength and tensile splitting strength in terms of concrete paving blocks as referred to in SANS 1058:2021?

- One would imagine that if compressive strength of the concrete paver would increase the tensile splitting strength would also increase. This is however not true.

1. Compressive Strength and Tensile Splitting Strength

There is no correlation between compressive strength and tensile splitting strength.

It is a well-known fact, that if the sand content in the concrete mix increases the compressive strength of the unit will increase as well. An increase in the sand content however influences the sheer strength of the unit negatively, in other words the tensile splitting strength reduces. This can mainly be contributed to the homogeneous particle shape of sand and the way it binds with cement. Should the stone content in a concrete paver be increased (reduced sand) the tensile splitting strength will increase.

The reason for this is that the inconsistent particles shapes of the stone contribute to a less favourable sheer path thus increasing tensile splitting strength.

- *It is general practice to increase the sand content in concrete pavers because it assists with the aesthetic appearance of the paving block. This is however a practice which manufacturers should apply with great caution.*

The specification of concrete paving blocks in design, technical documents and tenders remains problematic. One would presume that the South African National Standard should, and would be the ultimate specification. What happens is that a lot of architects, engineers, consultants, contractors, buyers and specifiers are not up to date with recent specifications. SANS 1058:2021 supersedes SANS 1058:2012 (edition 2). The current version of the specification excludes compressive strength testing and only calls for tensile splitting strength.

It is seldom seen that concrete pavers crumble under pressure (compressive strength). What is more seen, is concrete pavers which cracked under pressure (tensile splitting strength).

When specifying concrete pavers in design, technical documents and tenders it should be done according to the South African National Standard. This is done by stipulating the class of the concrete paver. Although the classes still refer to compressive strength, the actual indicator of importance is tensile splitting strength.

It is dangerous to specify concrete pavers only with regards to compressive strength. A concrete paver might have high compressive strength but would fail as soon as a point load is applied to it. This is clear from the afore mentioned.

Cognisance should also be given to the two classes of concrete pavers mentioned in the standard. During testing class 40/2.6 should perform above 90% of all testing parameters. Class 30/2.0 is not recommended for heavy traffic.

Precast concrete units certified to conform to the South African National Standard specifications can be identified by the CMA Certification Services mark of approval.

Testing Imagery



**Concrete Block Paver
Tensile Splitting Strength**



**Concrete Block Paver
Compressive testing**

The Concrete Manufacturers Association's Producer Members manufacture precast concrete units of high quality and consistency because they all conform to a certain level of quality management within the organisations.

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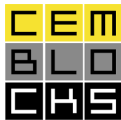
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