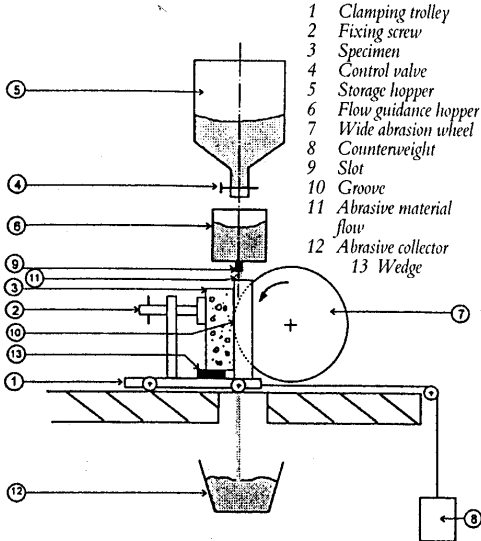
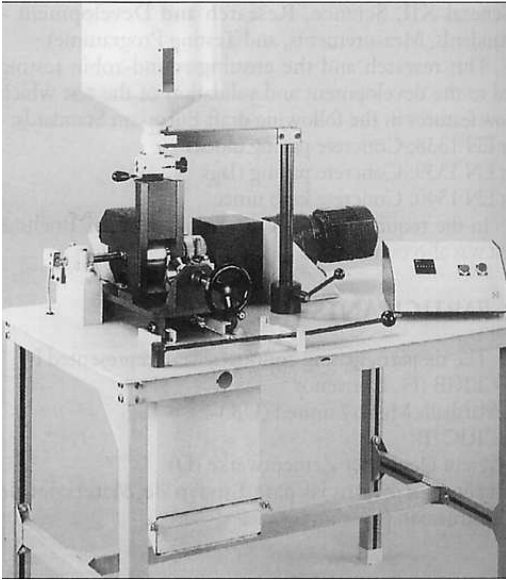


## Appendix U.5.11 – NF P98 303 - (Capon Test)

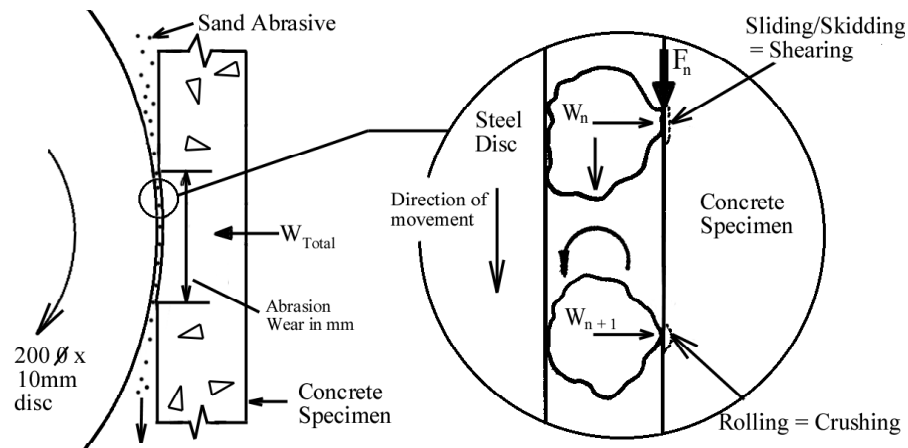
<b>Generic Name of Test</b>	Sliding Fine Abrasive : Abrasion Test										
<b>Principle of Test</b>	Rotating steel disc causes abrasive to slide/roll across face of loaded specimen										
<b>Historic Development of Test</b>	The abrasion test relating to the specification <i>NF P98-303 (1980) Concrete paving stones</i> is often referred to as the Capon test, the name being derived from the Parisian firm which built the first abrasion machine of this type. The test was originally defined in the French standard for ceramic tiles NF P 61-311 which uses the identical apparatus. Discussions within CEN/TC 178 led to the adoption of the Capon method for European testing of concrete (prEN1338), with the modification of using a wide (70mm) wheel. The second edition of this test came out in 1983 (first edition in 1980) [v.d. Klught (1986), Yates (2000)]										
<b>Apparatus and Abrasives</b>	The apparatus (shown in figure U.5.11.1 and U.5.11.2) consists of a steel disk with a diameter of 200mm and a width of 10mm. The concrete specimen (100 x 100mm) is clamped in a vertical position on a sliding trolley. A counterweight provides a constant force on the abrasion wheel. Abrasive grit is stored such that a constant flow rate can be achieved. [Vallès (1997)]										
 <p><b>Figure U.5.11.1</b> Schematic representation of the apparatus used in the Capon Test. The width of the wheel is 10mm</p>	 <p><b>Figure U.5.11.2</b> The Capon test apparatus is similar to this prEN1338 wide wheel machine</p>										
<b>Test Method</b>	The grinding wheel rotates at 75 rpm while the test specimen is pressed with a constant force against the wheel. A constant flow of abrasive is provided and the test duration is 150 revolutions.										
<b>Abrasion Wear</b>	The length of the abraded groove is measured after which the volume loss is calculated and reported in mm <sup>3</sup> . According to Sanchez the acceptance criteria for concrete paving is that the length of the groove be less than 25mm.										
<b>References</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Author</u></th> <th style="text-align: left;"><u>Comment</u></th> </tr> </thead> <tbody> <tr> <td>Alexander (1984)</td> <td>Source document</td> </tr> <tr> <td>v.d. Klught (1989)</td> <td>Source document</td> </tr> <tr> <td>Dowson (1994)</td> <td>Source document</td> </tr> <tr> <td>Sanchez (1994)</td> <td>Source document</td> </tr> </tbody> </table>	<u>Author</u>	<u>Comment</u>	Alexander (1984)	Source document	v.d. Klught (1989)	Source document	Dowson (1994)	Source document	Sanchez (1994)	Source document
<u>Author</u>	<u>Comment</u>										
Alexander (1984)	Source document										
v.d. Klught (1989)	Source document										
Dowson (1994)	Source document										
Sanchez (1994)	Source document										

**Wear Mechanisms according to Author**

- (i) Alexander (1984): The grinding action is that of friction, scraping and attrition.
- (ii) Visual Effects: None available

**Wear Mechanisms according to writer [R2 S2 I0]**

(i) Rolling and Skidding: The mechanism of wear is one of microscopic crushing and shearing at the contact points, as the steel disk forces the sand to move across the face of the specimen (see figure U.5.11.3). The sand will both skid and roll. The predominant action in the case of skidding/sliding will be shearing in the form of scratching, scraping and cutting of the asperities. In the case of rolling, sharp points are likely to generate high compressive stress, resulting in microscopic crushing in very localised areas. The corresponding abrasion wear may be referred to as  $Q_{Crushing} \propto W_{n+1}$  and  $Q_{Shearing} \propto F_n = \mu W_n$



**Figure U.5.11.3** Rolling and sliding wear mechanism

Note: This test does not measure the aggregate/paste bond. The aggregate particles that are loosened during the abrasion process are unable to 'escape'. In effect they contribute to an unrealistically high 'abrasion resistance' result, whereas in practise they would be plucked out of the matrix by traffic etc. The size of loose aggregate that is in effect 'trapped' will depend on the gap between the test sample and the grinding disc, and this in turn is determined by the size of the abrasive particles.

- (ii) Adhesion and deformation: See note 1 in introduction to appendix U