

ADHESION BETWEEN AGGREGATES AND BITUMEN - BOILING WATER TEST AND INDIRECT TENSILE STRENGTH TEST

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ABSTRACT

The most commonly used test to determine the quality of adhesion between aggregates and bitumen – the rolling bottle test – is simple, yet subjective because of a visual evaluation of the percentage of stripped aggregates. An objective, quantitative test is described in EN 12697-11, part C [6] – the boiling water test on loose coated aggregates. However, hazardous chemicals are needed for this test which disqualifies this test as a standard testing method.

In this paper, the boiling water test according to EN 12697-11, part C [6] was modified in different ways using non-hazardous methylene blue and a photometer to determine the percentage of stripped aggregates after boiling. The results of this new modified test were compared to a proven test method for adhesion on compacted asphalt using the same aggregates (greywacke, diabase) and bitumen (50/70 and PmB). This test method (according to Nösler [4]) includes a 24-hour exposure of Marshall specimens in 50° C hot water. The decrease of the resilient modulus (RM) after water exposure is being determined with the dynamic indirect tensile test which gives a measure of the adhesive strength of the asphalt mixture. The modified boiling water test using methylene blue and the data interpretation after EN 12697-11, part C [6] was not able to deliver plausible results. However some approaches were made based on the modified boiling water test apart from the EN 12687-11.

Also, some important findings in the field of adhesion of laboratory aged Marshall specimens were made. It was found out that the absolute loss of the RM was about the same for both aged and unaged test specimens.

KEY WORDS: Adhesion, boiling water test, dynamic indirect tensile test, aging