

ALBERTA TRANSPORTATION

TECHNICAL STANDARDS BRANCH

BT005 - JULY 2000

TEST PROCEDURE FOR MEASURING THE WATERPROOFING PERFORMANCE OF CORE SAMPLES TAKEN FROM SEALED CONCRETE SURFACES

SCOPE - This test procedure is used to evaluate the effectiveness of sealers previously applied to concrete in the field. It is an adaptation of the cube immersion test, BT001, used in the approval of sealers for use on bridges. The test is done on 75 mm diameter cores. The test is based on mass changes due to water absorption. Comparison is made between absorption in the sealed and non-sealed ends of the core. The non-sealed end serves as the control surface for comparative purposes. The test is performed differently for coatings (Method A) and penetrating sealers (Method B).

1.0 PROCEDURE

- 1.1 Trim the cores by cutting the bottom, non-sealed face to achieve a length of 50 mm. Record length and diameter of each core. Sandblast the sawcut, non-sealed face to open the pores that have become plugged by sawcutting.
- 1.2 Identify the sealed end of each core. Sealed end will have grooves or broom finish instead of polished sawcut surface.
- 1.3 Dry cores in oven at 70°C until constant mass is reached, defined as a 24 hour change of less than 0.2% of the previous core mass determination. Progressively increase oven temperature 10°C per hour to avoid thermal micro-cracking. Weigh cores within 1 hour of removal from oven or store cores in desiccator during cooling period prior to weighing.
- 1.4 Seal the round sides of the core with a minimum 3 mm thick coating of wax. Record mass of core to the nearest tenth of a gram. Inspect waxed side wall of core to ensure there are no pinholes in the wax within the 10 mm immersion depth.

2.0 METHOD A (NON-PENETRATING SEALERS)

- 2.1 Immerse cores vertically with sealed end downward 5 mm deep in tap water on pins or other supports to allow water access to sealed end of core. The water level should be of uniform depth for each core. Always test sealed end first to reduce the amount of subsequent oven drying. Remove the cores at 24 hours, lightly towel the surface and record the mass of the core. Record mass of water absorbed as MS.

2.2 If MS is less than 2 grams proceed with next step. If MS is more than 2 grams, oven dry at 50°C (or remove wax and oven dry at 70°C) until mass is within 2 grams of pre-immersion mass. Oven drying of waxed cores sometimes causes air bubbles in the wax to become pinholes and should be avoided.

2.3 Repeat the immersion with the non-sealed (control) end facing down at a depth of 5 mm in tap water on pins or other supports that allow water access to the immersed end of the core. Lightly towel and re-weigh cores at 24 hours. Record the mass absorbed by the control face as MC. Immersion water shall be changed once a week.

3.0 METHOD B (PENETRATING SEALERS)

3.1 Immerse cores vertically with sealed end facing downward 10 mm deep in tap water on pins or other supports to allow water access to sealed end of core. The water level should be of uniform depth for each core. Always test sealed end first to reduce the amount of subsequent oven drying. Remove the cores at 24 hours, lightly towel the surface and record the mass of the core. Record the mass increase as MS1.

3.2 If MS1 is less than 2 grams, proceed to next step. If MS1 is more than 2 grams oven dry at 50°C (or remove wax and oven dry at 70°C) until mass is within 2 grams of pre-immersion mass. Oven drying of waxed cores sometimes causes air bubbles in the wax to become pinholes and should be avoided.

3.3 Sandblast the sealed surface of the core to uniformly remove 5.5 ± 0.5 g of cement paste. Maintain the nozzle at 90° angle to the surface during blasting. Shield the remaining surfaces of the core from being blasted. Record core mass after blasting.

3.4 Repeat immersion as detailed in 5.1. Record the mass increase as MS2.

3.5 Dry cores as detailed in 6.1. Record mass.

3.6 Repeat the immersion with the non-sealed end downward 5 mm deep in water. Lightly towel and re-weigh cores at 24 hours. Record mass absorbed by control face as MC. Immersion water shall be changed once a week.

4.0 **REPORTING OF RESULTS**

4.1 Report the results for each core:

- **Procedure A**

Dampproofing performance = $[(MC - MS)/MC] \times 100$

- **Procedure B**

Dampproofing performance before abrasion = $[(MC - MS1)/MC] \times 100$

Dampproofing performance after abrasion = $[(MC - MS2)/MC] \times 100$