Certificate of Test

Supplement to Certificate of Test number 8826 issued by Taylor Woodrow on 29th May 2007.

Since the original Certificate was issued, the 'Sandtex' brand name has been changed to 'Sandtex Trade' and 'Akzo Nobel Decorative Coatings Ltd' has been renamed as 'Crown Paints Limited'.

Title:

CROWN PAINTS LTD

Sandtex Trade High Cover Smooth

Determination of Carbon Dioxide Diffusion Coefficient

Certificate of Test No: **11335**

Client's Name & Address:

Crown Paints Ltd
PO Box 37
Crown House
Hollins Road
Darwen BB3 0BG

Our Ref:	**1.151.7**
Job No:	**T591-3LK6**
Your Ref:	**PO 4500888787**
Date:	**5 February 2009**
Date Sample(s) Received:	**4 April 2007**
Sample(s) Received From:	**Crown Paints**

Sample No(s): **143967**

Tested By: ..... **D J Thompson**

Authorised By: S.R.Mox **S R Moxon**

Job Title: **Manager, Testing & Contracting**

For

Taylor Woodrow Technology

Stanbridge Road, Leighton Buzzard, Bedfordshire, LU7 4QH
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UKAS TESTING
0057

TAYLOR WOODROW

1. SAMPLE DESCRIPTION AND ANALYSIS REQUIRED

The Materials Testing Laboratories received one tin of Sandtex Trade High Cover Smooth (TW ref. 143967). The coating was given a unique sample number for reference purposes only. No Certificate of sampling was received.

The laboratories were requested to determine the carbon dioxide diffusion coefficient in accordance with our UKAS accredited In-House Test Procedure TP950/05/13569 Issue 1, which is in general accordance with EN 1062-6:2002.

2. METHOD

2.1 Coating Application

The coating system was brush applied to previously characterised porous plates using a weighing procedure to achieve the coverage rate required. Two coats of Sandtex High Cover Smooth were applied, each at a rate of 77g/m^2, with a minimum drying period of 4 hours between coats. The second coat was applied at 90° to the first. The coated sample was allowed to cure for 2-3 days in the laboratory, and then conditioned at 23±2°C and 60±5% relative humidity for a minimum period of four weeks prior to testing.

2.2 Determination of Carbon Dioxide Diffusion Resistance*

One coated tile (specimen no. 143967/4) was sealed in a circular steel rig such that the coated and uncoated faces were exposed. Carbon dioxide (15% in oxygen) at a known pressure and flow rate was passed over the coated face of the plate and helium gas was passed over the opposite face at the same pressure and flow rate. The helium gas stream was continuously monitored by gas chromatography to analyse for carbon dioxide. Equilibrium conditions were achieved after approximately 24 hours and the steady state flux of carbon dioxide was then calculated from the percentage of carbon dioxide in the helium stream and the flow rate of this gas.

The diffusion coefficient for carbon dioxide (Dco_2) is calculated using Fick's Law of Diffusion and Crank's equation.

* In-House Test Procedure TP950/05/13569 Issue 1.

3. RESULTS

The results of the analysis are tabulated below.

CARBON DIOXIDE DIFFUSION RESISTANCE

Coating System	**Sandtex Trade High**
Name	**Cover Smooth**
TW Specimen No.	143967/4
Dco_2 (cm^2s^{-1})	6.82×10^{-8}
μ-value	$2.18 \times 10^{+6}$
R (m)	129
Sc (cm)	32
Mean Dry Film Thickness (μm)	59
Date of Test	16 May 2007

Notes:

i) R (equivalent air layer thickness) and Sc (equivalent thickness of concrete) are dependent on the film thickness and are calculated here for the dry film thickness (DFT) present.

ii) Dco_2 and the diffusion resistance coefficient (μ-value) are calculated using the mean DFT measured on a spare unused specimen.

iii) Dco_2 for an uncoated plate is 1.0×10^{-3} cm^2s^{-1}.

iv) S_C is calculated assuming an average grade concrete where the μ-value has been estimated as 400.

v) Klopfer criterion for effective anti-carbonation coating is R greater than 50 metres.

vi) EN 1062-6 Classification C_1 for Carbon Dioxide Permeability requires the Sd value (R) to be greater than 50 metres.

END OF CERTIFICATE