Certificate of Test

Supplement to Certificate of Test number 7463 issued by Taylor Woodrow on 26th August 2004.

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

Title:

CROWN PAINTS LIMITED

Determination of Carbon Dioxide Diffusion Coefficient of Sandtex Trade Textured Masonry Coating

Certificate of Test No: **11329**

Client's Name & Address:

Crown Paints Ltd
Hollins Road
Darwen
LANCASHIRE
BB3 OBG

Our Ref:	**1.151.7**
Job No:	**T591-3LK6**
Your Ref:	**-**
Date:	**5 February 2009**
Date Sample(s) Received:	**21 November 2002**
Sample(s) Received From:	**Crown Paints Ltd**

Sample No(s): **129985**

Written By: ..... **K J Stagg**

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

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

For

Taylor Woodrow Technology

Stanbridge Road, Leighton Buzzard, Bedfordshire, LU7 4QH

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TAYLOR WOODROW

1. SAMPLE DESCRIPTION

One litre of Sandtex Trade Matt based on QE101 (sample no. 129985) was received by the Materials Testing Laboratories. No Certificate of sampling was received. The sample was given a unique sample number for reference.

The carbon dioxide diffusion coefficient was to be determined in general accordance with In-House Test Procedure TP1303/90/4671 Issue 1.

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 Trade Matt were applied, each at a rate of 280g/m^2, with a minimum drying period of eighteen hours between coats. Each 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%RH for a minimum period of four weeks prior to testing.

2.3 Determination of Carbon Dioxide Diffusion Resistance*

One coated tile (specimen no. 129985/2) 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 TP1303/90/4671 Issue 1.

3. RESULTS

The results of the analysis are tabulated below.

Carbon Dioxide Diffusion Resistance

Coating	Sandtex Trade Matt
QUV Weathered for (hours)	0
TW Specimen No.	129985/2
Dco_2 (cm^2s^{-1})	1.37E-07
µ-value	1.09E+06
R (m)	234
Sc(cm)	58
Mean Dry Film Thickness (µm)	215
Date of Test	15-04-03

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 on the test specimens.

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.

END OF CERTIFICATE