

Certificate of Test

Supplement to Certificate of Test number 12123 issued by Taylor Woodrow Technology on 14 July 2009.

Since the original Certificates were issued, the product known as 'Jotashield Tex Ultra' has had no formulation change.

Since the original Certificate was issued, Taylor Woodrow Technology has rebranded as VINCI Construction UK Ltd. Technology Centre.

Title: Determination of Chloride Ion Diffusion of Jotashield Tex Ultra After 2000 hours QUV Weathering

Certificate of Test Number: 13535

Client's Name & Address:

Jotun UAE LLC
Al Quoz Industrial Area
PO Box 3671
Dubai
United Arab Emirates

Our Ref: N950/V018

TC Job No: 3NF3/1.064.27

Your Ref: PO 54798

Date: 06 October 2010

Date sample(s) received: 16 January 2002

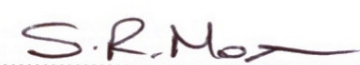
Sample(s) received from: Jotun UAE LLC

Sample No: 129543

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Tested by: 
D J Thompson (position: Engineer)

This Certificate and the results shown are based upon the information drawings samples and tests referred to herein

Authorised by: 
S R Moxon (position: Manager)

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Technology Centre

Stanbridge Road, Leighton Buzzard, Bedfordshire, LU7 4QH

Tel No. 01525 859000

Registered Office, Watford

Fax No. 01525 859001

Registered No. 2295904 England

TECHNOLOGY CENTRE 

1. INTRODUCTION

This certificate of test describes chloride ion diffusion testing carried out at the request of Jotun UAE LLC on Jotashield Tex Ultra (Weathered).

The testing was carried out in accordance with Technology Centre (TC) Internal Method XTP/01411/85/2763.

2. SAMPLE DESCRIPTION

Technology Centre received one tin of Jotun Siloxane Acrylic primer (TC Ref 129543) and one tin of Jotashield Tex Ultra (TC Ref 129543). The coatings were given unique TC sample numbers for reference purposes only.

3. TEST PROCEDURE

3.1 Coating Application

The coating system was brush applied to three Technology Centre standard concrete slices (approximately 100mm diameter x 10mm thick). Any blow holes in the cut surfaces had previously been filled with cement paste. These surfaces were then ground smooth and left to air cure.

A weighing procedure was used to achieve the coverage rate required. A flood coat of Jotun Siloxane Acrylic Primer was applied and allowed to dry for a minimum period of 8 hours. Two coats of Jotashield Tex Ultra were applied, each at a rate of 465g/m^2 , with a minimum drying period of 24 hours between coats. The second coat was applied at 90° to the previous. The coated sample was allowed to cure for 2-3 days in the laboratory, and then conditioned at $23\pm 2^\circ\text{C}$ and $60\pm 5\%$ relative humidity for a minimum period of four weeks prior to testing.

3.2 Accelerated Weathering – 2500 hours

The samples were then placed in a QUV accelerated weathering device under an exposure regime (QUV-A) designed to simulate UK conditions, 4 hours UV at 50°C followed by 4 hours condensation at 40°C . The samples were allowed to dry in the laboratory for three days and were then conditioned for a minimum of 4 weeks at $23\pm 2^\circ\text{C}$ and $60\pm 5\%$ relative humidity prior to testing.

3.3 Sample Preparation

One coated specimen (TC Ref 129543/2) and an uncoated control sample had their top and bottom faces masked with plastic and tape respectively, they were then placed in individual moulds and the edges sealed with cold curing epoxy resin. After allowing the resin to cure overnight, the specimens were immersed in saturated calcium hydroxide solution for 4 days. (This procedure is used to avoid anomalous effects due to chloride ingress by sorption rather than diffusion). Each specimen was then mounted in a diffusion cell as shown in Figure 1. (Coated surface on solution (a) side).

3.4 Measurement of Chloride Ion Diffusion

The cells were maintained at $23\pm 2^\circ\text{C}$ and the chloride diffusing through the specimens was determined at suitable intervals using the method described in 3.5. This method required withdrawal of a 10 cm^3 aliquot and, therefore, the cells were topped-up on each occasion with 10 cm^3 of saturated calcium hydroxide solution.

3.5 Measurement By Titration

An aliquot of each sample was accurately pipetted into a clean oven dried glass container. Nitric acid (approximately 50-70cm³) was cautiously added to the sample, which was then left to stand with occasional stirring. Automatic potentiometric titration, with continuous stirring was used to analyse the samples. The titrator used was a Metrohm 798 MPT Titrimo and the course of the titration was monitored using a Metrohm electrode system.

The above titration was carried out in general accordance with our UKAS approved In House Test Procedure TP1303/90/4670, Issue 10.

The accuracy of the method was checked using control samples of known chloride content (0.10±0.01% by weight of sample).

4. TEST RESULTS

CHLORIDE ION DIFFUSION COEFFICIENT RESULTS

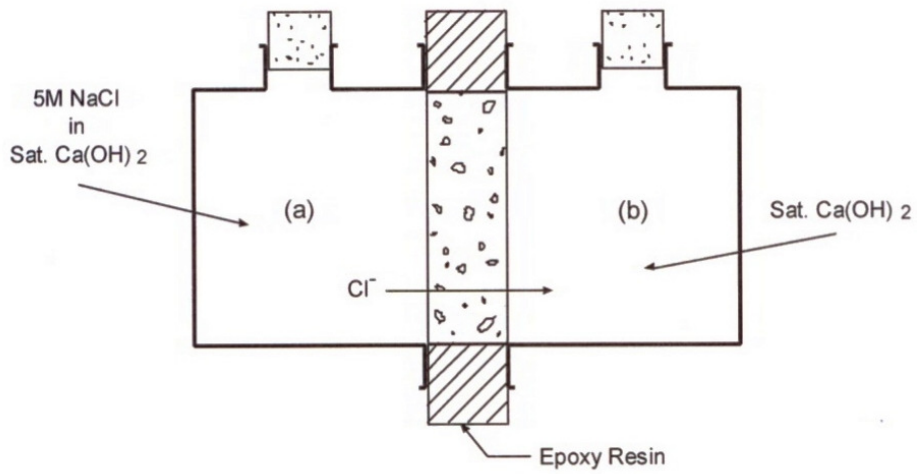
Client Ref		Jotashield Tex Ultra	Uncoated Control
TC Ref		129543/2	-
Substrate Thickness	(cm)	1.216	1.850
Coating Thickness	(cm)	189	-
Test Area	(cm ²)		
Chloride Ion Diffusion Coefficient	(cm ² s ⁻¹)	1.58 x 10 ⁻¹⁰	1.02 x 10 ⁻⁸

The Jotashield Tex Ultra coating system had reached a steady state after 2029 days (5yrs 6mths) on test and a diffusion coefficient has been calculated. See Figure 2 for the chloride ion concentration against time graph. Jotashield Tex Ultra coating system proved a good barrier against the ingress of chloride ions.

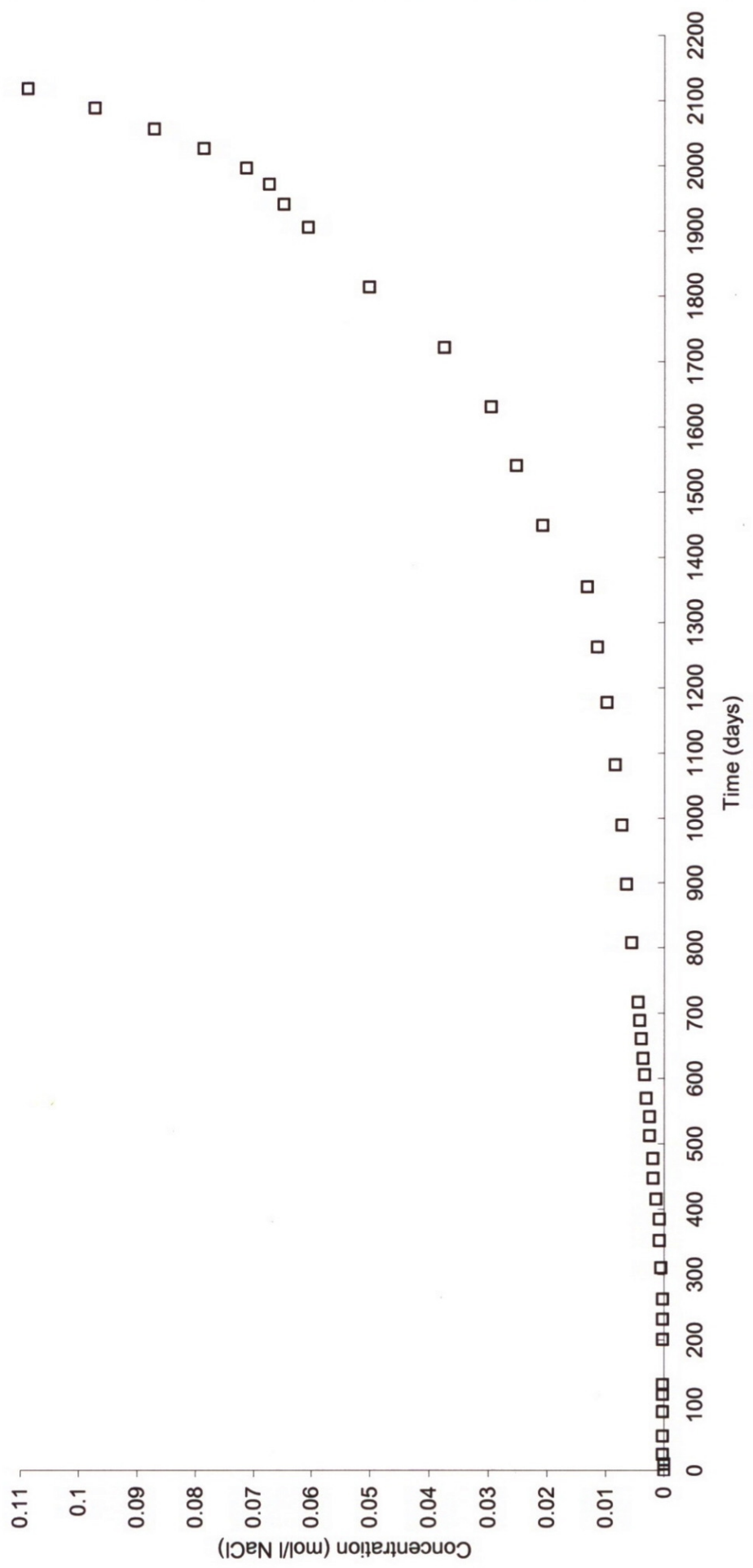
The test for the control has reached a chloride concentration level of 0.1Mol/L after 298days, which is deemed to be when an equilibrium status is reached. The chloride ion diffusion coefficient has been calculated (see Figure 3).

Figure 1

THE DIFFUSION CELL



CHLORIDE ION DIFFUSION
CLIENT REF. Jotashield Tex Ultra (Weathered)
TC REF.129543-2



CHLORIDE ION DIFFUSION
Non Coated Control
TC REF 141932 Control

