

# Certificate of Test

Title:

**JOTUN UAE LTD LLC**

**Determination of Chloride Ion Diffusion  
of Jotashield Tex Ultra**

Certificate of Test No: **7587**

Client's Name & Address:

**Mr S Matthew  
Jotun UAE Ltd LLC  
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Dubai  
United Arab Emirates**

Our Ref: **1.64.1/KAL**  
Job No: **T474-3ET3**  
Your Ref: **-**  
Date: **22 February 2005**  
Date Sample(s) Received: **10<sup>th</sup> February 1999**  
Sample(s) Received From: **Jotun UAE Ltd LLC**

Sample No: **125228 and 125229**

Tested By:  ..... **K Lucas**

Authorised By:  ..... **A T Blake**

Job Title: **Manager, Materials Test Laboratories**

For

**Taylor Woodrow Technology**

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## 1. SAMPLES RECEIVED

One litre of Jotun Siloxane Acrylic Primer (TW Sample No. 125228) and one litre of Jotun Jotashield Tex Ultra (Sample No. 125229), were received by the Materials Testing Laboratories. No certificate of sampling was received.

The coating system was to be tested for chloride ion diffusion

## 2. SAMPLE PREPARATION

Three concrete slices (approximately 15mm thick) were cut from a TW standard concrete core (100mm diameter) and allowed to air dry. Blow holes in one cut surface were filled with cement paste which was allowed to harden under polythene for two days. These surfaces were ground smooth and left to air cure for a further five days. One slice was retained as a control and two slices were coated.

Jotun Jotashield Tex Ultra was brush applied onto the remaining concrete slices using a weighing procedure to achieve the coverage rate required. Initially a flood coat of Jotun Siloxane Acrylic Primer was vertically applied. After 24 hours, two coats of Jotashield Tex Ultra were applied at a rate of  $450\text{g/m}^2$  per coat allowing a minimum of 4 hours drying time between each coat. The second coat was applied at  $90^\circ$  to the first coat.

The coated specimens and the control were then conditioned at  $23 \pm 2^\circ\text{C}$  and  $60 \pm 5\%$  RH for a minimum period of 4 weeks prior to testing.

## 3. METHOD

### 3.1 Measurement of Chloride Ion Diffusion

After masking the top and bottom faces with tape, the coated and the control samples were placed in individual moulds and the edges sealed with an epoxy resin. After allowing the resin to cure, each specimen was mounted in a diffusion cell as shown in Figure 1. (Coated surface on side (a)). Two specimens were initially put on test, to check seals, however, only one was used for the analysis.

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 3.2. This method required withdrawal of a  $10\text{ cm}^3$  aliquot and, therefore, the cells were topped-up on each occasion with  $10\text{ cm}^3$  of saturated calcium hydroxide solution.

### 3.2 Measurement By Titration

An aliquot of each sample was accurately pipetted into a clean oven dried glass container. Nitric acid 10% (approximately  $50\text{-}70\text{cm}^3$ ) 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 682 Titroprocessor and the course of the titration was monitored using a Metrohm electrode system.

The above titration was carried out in general accordance with In House Test Procedure TP1303/90/4670, Issue 4. The accuracy of the method was checked using control samples of known chloride content ( $0.10 \pm 0.01\%$  by volume of sample).

#### 4. RESULTS

	TEX ULTRA	UNCOATED CONTROL
Specimen No.	125229/9	-
Thickness (cm)	1.50	1.54
Test Area (cm <sup>2</sup> )	77.48	76.71
Chloride Ion Diffusion Coefficient (cm <sup>2</sup> s <sup>-1</sup> )	-	6.47 x 10 <sup>-9</sup>

Diffusion has occurred in the coated sample at a very low rate after approximately 2090 days on test (see Figure 2). It is not possible to calculate a diffusion coefficient at this stage of the test because equilibrium has not been attained.

The test for the control sample is complete and a diffusion coefficient has been calculated (see Figure 3).

Figure 1

#### THE DIFFUSION CELL

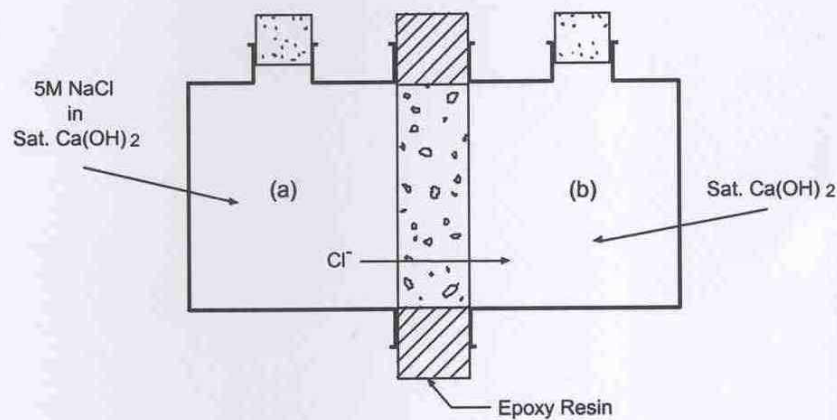


Figure 2

CHLORIDE DIFFUSION  
JOTASHIELD TEX ULTRA  
TW SAMPLE NO. 125229/9

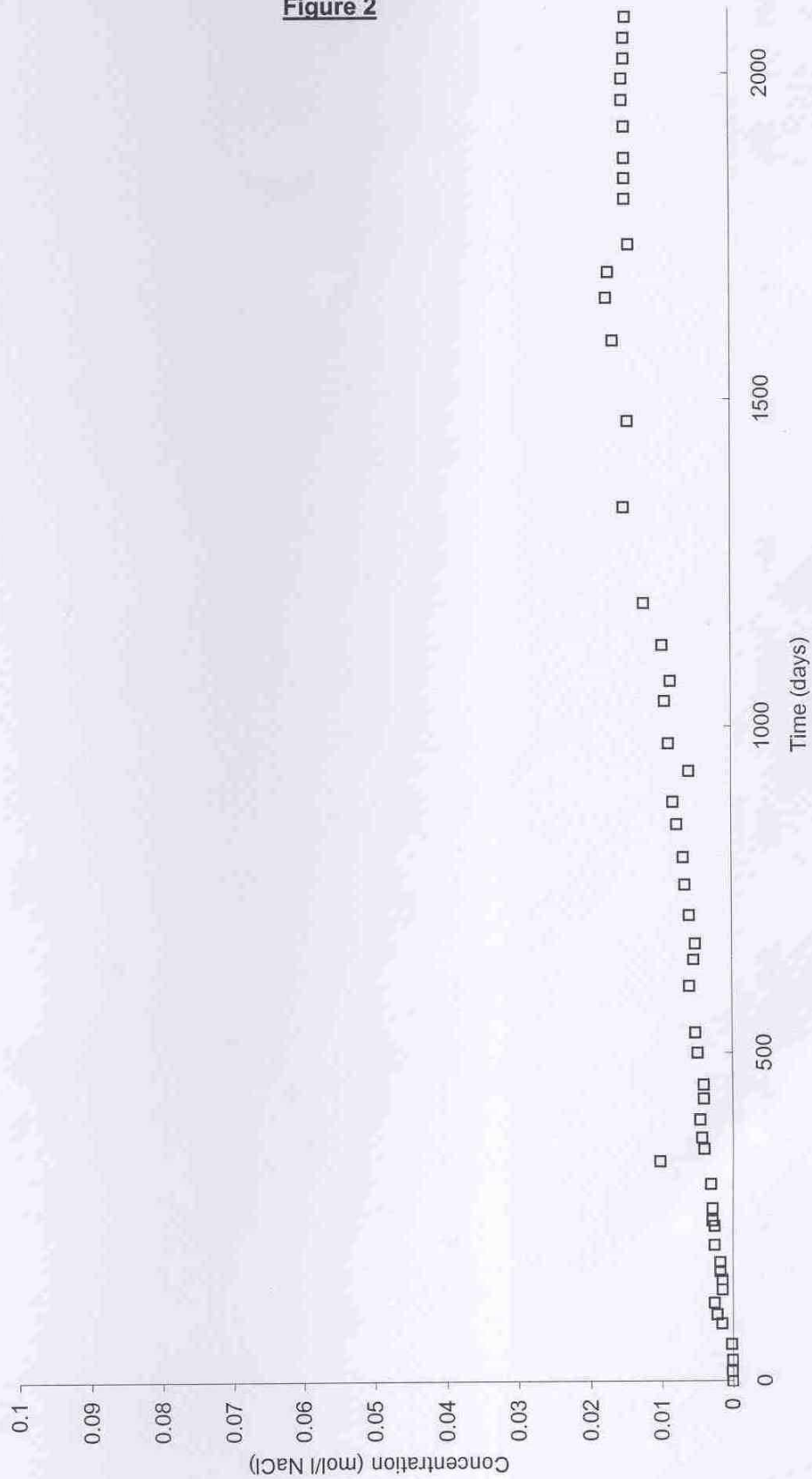
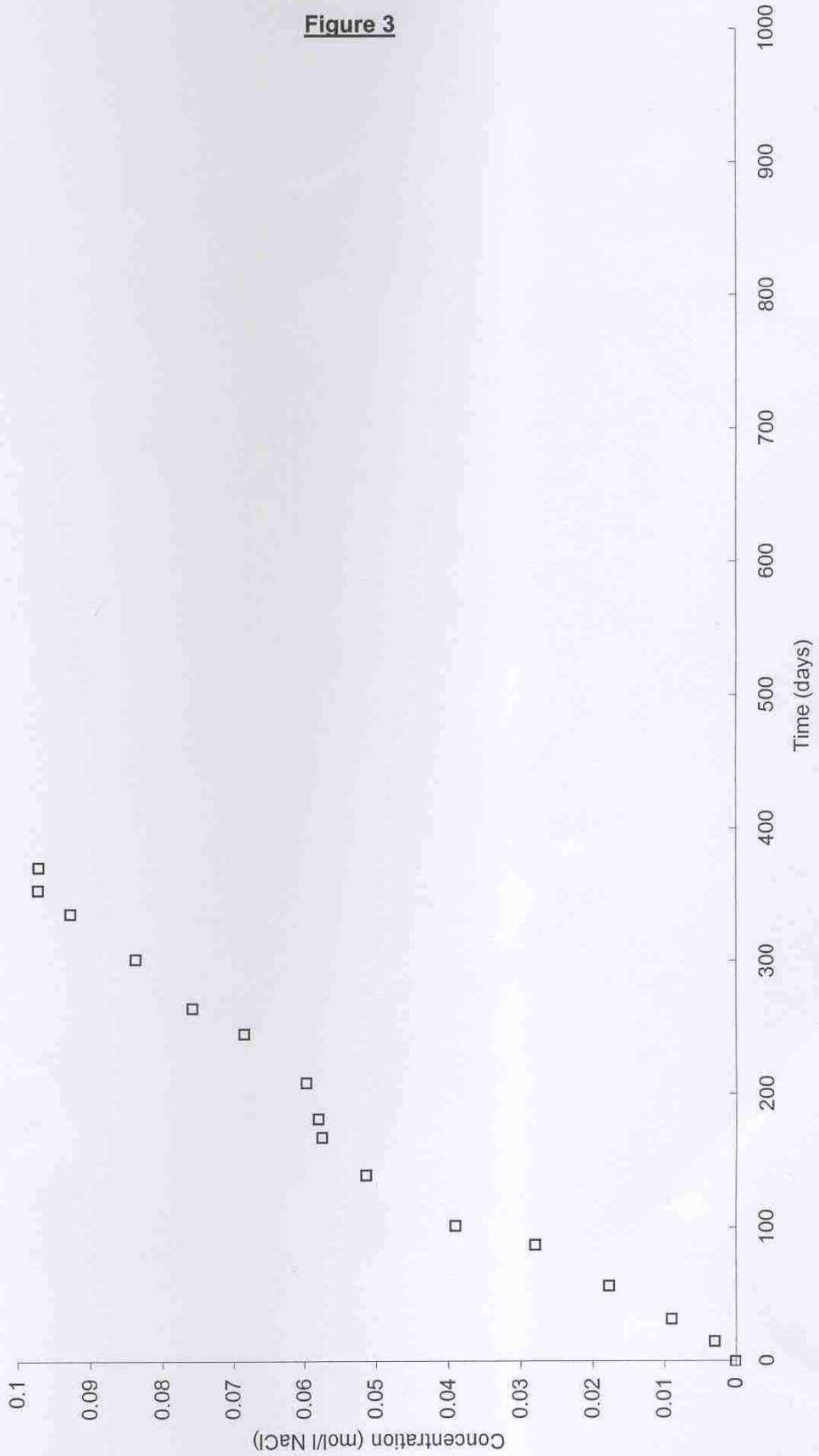


Figure 3

CHLORIDE DIFFUSION  
CONTROL FOR JOTASHIELD SAMPLES



END OF CERTIFICATE