ALBERTA TRANSPORTATION

TECHNICAL STANDARDS BRANCH

BT008 – FEBRUARY 2004

TEST PROCEDURE FOR FINGER PRINTING SEALERS USING INFRARED SPECTROSCOPY AND GAS CHROMATOGRAPHIC SEPARATION

SCOPE - This test procedure outlines the limits at which the infrared spectrographic and gas chromatographic analysis is determined by analytical labs.

1.0 GENERAL

1.1 INTRODUCTION

To ensure that the sealer products supplied for field application are the same as the approved products, finger printing of the product before application shall be done using the spectrographic and chromatographic analysis test methods.

1.2 RELATED DOCUMENTS

- B388, "Specification for the Supply of Concrete Sealers"
- BT001, "Test Procedure for Measuring the Vapour Transmission, Waterproofing and Hiding Power of Concrete Sealers"

2.0 TEST PROCEDURE FOR FINGER PRINTING SEALERS USING INFRARED SPECTROSCOPY AND GAS CHROMATOGRAPHIC SEPARATION

2.1 OVERVIEW

The laboratory performing the test shall follow standard procedures.

2.2 METHOD A - INFRARED SPECTRA (IR)

The sample is analyzed as a neat film between two potassium bromide (KBr) plates using an infrared spectrophotometer. If there is water present in the sample, silver chloride (AgCl) plates must be used since KBr plates are soluble in water and may be ruined after exposure to water based products. The spectrum is recorded between 4000 to 400 wavenumbers (cm^{-1}). The format of the spectrum is absorbance units. No peak will have an absorbance value of greater than 2.5 absorbance units. This spectrum provides a composite view of all the components contained in the sample

2.3 METHOD B - GAS CHROMATOGRAPH (GC)

Gas Chromatography (GC) is a technique whereby the volatile components of a sample mixture are separated and quantified using a suitable chromatography column and injector/detector system. For the analysis of these materials, a suitable chromatographic system should consist of the following components and conditions.

- GC Column - 5% diphenyl, 95% dimenthylpolysiloxane bonded stationary phase column, 30 m x 0.25 mm x 0.25 um film thickness (e.g. DB-5 or DB-5MS column)
- Injector – split injector (100:1), 300 ºC
- Detector – Flame Ionization (FID), Mass Selective Detector (MS) or other suitable detection system, 300 ºC
- Carrier Gas – helium
- Carrier Gas Flow Rate – 0.8 mL/min (0.6 to 1.0 mL/min acceptable range)
- Oven Program – initial temperature 50ºC, hold 5 minutes, temperature program rate 10ºC/minute until 300ºC, hold at 300ºC for 5 minutes.
- Run time – 35 minutes
- Injection Volume – 1 μL of neat solution

The chromatograph shows the various component peaks and their corresponding retention times. The area percent report lists each of the peaks detected and their respective percent area results.

3.0 REPORTING OF RESULTS

Original graphs of the spectrographic (IR) and chromatographic (GC) analysis showing frequency versus amplitude and separation versus time shall be reported for each product tested.

In addition to the graphs, test data from the IR and GC tests shall be submitted.

Two component sealers, such as epoxies, will require separate graphs for each component. Comparison of previously tested samples and difference between samples were applicable shall be included in the report.