

**Certificate of Analysis**

October 1, 2012

**Report For:** M.I. MUNICIPALIDAD DE GUAYAQUIL  
Malecon y 10 de Agosto  
Guayaquil, Ecuador

**Attn:** Ab. Jaime Nebot

**Test Ordered by:** HI-LITE ECUADOR S.A.

**Attn:** Oscar Stavseth

<b>Sample ID:</b> 6 De Marzo St. & Lorenzo De Garaycoa St. (2 Control Samples & 2 Rejuvenator Samples For Each Street)	<b>Project #:</b> HILT 05-02-01/04
<b>Sample Date:</b> Cores Received 9/26/12	<b>Type:</b> Top 3/8" of Cores

**OBJECTIVE:** Evaluate pavement performance in accordance with the FAA P-632 Table 2 Bituminous Pavement Rejuvenation specifications.

**DATA/RESULTS:**

Location	Sample Type	Ecuador Rejuva Seal Project		
		AASHTO T 315		
		DSR Viscosity, $\eta = G^* / \omega$ , Poise	Complex Modulus, $G^*$ , Pa	Phase Angle, $\delta$ , °
Recovered Binder				
6 De Marzo St.	Control	1,341,000	134,100	53.80
	Treated	276,500	27,650	64.66
	<b>% Difference</b>	<b>-79.4</b>	<b>-79.4</b>	<b>14.7</b>
Lorenzo De Garaycoa St.	Control	481,900	48,190	59.25
	Treated	175,200	17,520	70.48
	<b>% Difference</b>	<b>-63.6</b>	<b>-63.6</b>	<b>19.0</b>

**CONCLUSION:** All locations passed the FAA P-632 AASHTO T 315 section stating samples must be reduced by at least 40% of the control Viscosity.

**PROCEDURE:** All cores were saw-cut removing the top 3/8" layer of the core. The material was broken up and extracted using method ASTM D 2172 (Method A) with toluene and ASTM D 5404 to recover the binder. Complex Modulus, Viscosity, and Phase Angle were tested by AASHTO T 315. In order to limit the amount of coring on site Absolute Viscosity ASTM D 2171 was not performed. All results are listed in the table above.

Tested by:   
Jimmy Ynigues, Pavement Technician

Date: October 1, 2012

Reviewed by:   
Matt Groh E.I.T., Pavement Services Manager

Date: October 1, 2012