

1. DURAMENT Roadway Stabilization Testing Guide

The purpose of this document is to provide guidelines and recommendations for pre and post-application for geotechnical, performance tests and validation of the resultant **DURAMENT RS** treated roadway.

2. Pre-application of DURAMENT RS- Geotechnical and Site Analysis

Traditional roadway design and rehabilitation require a number of standard geotechnical tests be performed for both in-situ and outsourced materials. Minimum and recommended tests, applicable test standards, and notes are outlined below.

On site samples of in-situ material ought to yield an accurate representation of the area to be rehabilitated. A minimum depth of 500mm and a pit/hole covering each 500m² is recommended if the constituent sub-grade material appears to be inconsistent.

The sub-grade material is to be sighted as a minimum. The CBR value and density/compaction is tested to standard procedures. Compactions of <90% standard density will require improvement prior to upper level stabilization.

A site analysis should also include a survey to establish area levels, the location of services, drainage, and identify all

TEST	SPECIFIC	ASTM	NOTATIONS
Site Survey	Establish area levels, the location of services, drainage, and identify all other site features including the location of geo-fabric and grids.		
Soil Classification		D3282-09	classifying mineral and organomineral soils based on determination of particle-size distribution, liquid limit, and plasticity index.
Atterberg Limits	Liquid Limit (LL) Plastic Limit (PL) Plasticity Index (PI) Linear Shrinkage (LS)	D4318-10e1 D4318-10e1 D4318-10e1 D4943-08	
California Bearing Ratio (CBR)	4 day soak	D1883-07e2	evaluating the strength of materials having maximum particle sizes less than ¾ in.
Particle Size Distribution (PSD)	Sieve Analysis	D422-63	This test method covers the quantitative determination of the distribution of particle sizes in soils.
Moisture/density relationship	Optimum Moisture Content (OMC)	D698 & D1557 D558-11 (soil-cement mixes)	
Recommended			
Density compaction	Density of Soil and Soil-Aggregate	D2922-05 & D6938-08a	Sub-grade only Nuclear Densometer
Light weight falling deflectometer (LWD)	Measuring Deflections with a Light Weight Deflectomete	E2583-07	The deflections measured using an LWD can be used to determine the stiffness of bound and unbound pavement surfaces.
Los Angeles Abrasion		C131-06 & C353-2	Testing sizes of coarse aggregate smaller than 37.5 mm (1 1 / 2 in.) for resistance to degradation



3. During Application of **DURAMENT RS**

TEST	SPECIFIC	ASTM	NOTATIONS
Moisture/density relationship	Optimum Moisture Content (OMC)	D698 & D1557 D558-11 (soil-cement mixes)	Test by hand on-site
Density compaction	Density of Soil and Soil-Aggregate	D2922-05 & D6938-08a	Sub-grade only Nuclear Densometer

4. Post Application of **DURAMENT RS** - Geotechnical and Site Analysis

TEST	SPECIFIC	ASTM	NOTATIONS
Visual Inspection/Analysis	Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes	D3282-09	Test by hand on-site
Sub-grade/base & sub-base Density compaction	Density of Soil and Soil-Aggregate	D2922-05 & D6938-08a	Nuclear Densometer
California Bearing Ratio (CBR)	4 day soak	D1833-07e2 (lab) D4429-09a (in-situ)	
Unconfined compressive strength (UCS)		D2166-13 D4219-08	tests cohesive materials which will not expel or bleed water
Optimum moisture content (OMC)	Nuclear densometer	D2922-05 & D6938-08a	
	Recommended		
Light weight falling deflectometer (LWD)	Measuring Deflections with a Light Weight Deflectomete	E2583-07	The deflections measured using an LWD can be used to determine the stiffness of bound and unbound pavement surfaces.
Dynamic cone penetrometer		D6951	This test method covers the measurement of the penetration rate of the Dynamic Cone Penetrometer with an 8-kg [17.6-lb] hammer

Note: Dynamic deflection modulus (Evd) can be correlated with CBR using the following empirical relationships. ¹

AASHTO: $E_{vd} = 36CBR^{0.3}$

NAASRA: $E_{vd} = 22.4CBR^{0.5}$

Queensland Main Roads: $E_{vd} = 21.2CBR^{0.64}$

The most accurate relationship can be determined from the comparison of pre-work CBR and LWFD results.

5. Continued testing of a **DURAMENT RS** Roadway Post-application

DURAMENT RS roadways will continue to cure and harden for up to 30 days. It is important to test weekly after installation to ensure an accurate represent the result.

Due to exothermic reaction, a **DURAMENT RS** roadway will set rapidly with a very hard characteristic, so pre-drilling for testing reason will be required as hammering a nuclear densometer 'spike' a few hours after final compaction is typically NOT POSSIBLE.

It is recommended to keep a record of traffic volumes, loading, and weather conditions.

footnote #1. Look, B., 2007, Handbook of geotechnical investigation and design tables, Taylor & Francis, London

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