

**Item No. 202S
Hydrated Lime and Lime Slurry**

202S.1 Description

This item establishes the requirements for hydrated lime and commercial lime slurry of the type and grade considered suitable for use in the treatment of natural or processed materials or mixtures for stabilization of subgrade, subbase and base construction.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text and accompanying tables, the inch-pound units are given preference followed by SI units shown within parentheses.

202S.2 Submittals

The submittal requirements of this specification item may include:

- A. A plan identifying type, grade, chemical and physical composition of proposed lime application, and
- B. A plan for sampling and testing of lime slurry.

202S.3 Materials

The various types and grades are defined and identified as follows:

A. Type A (Hydrated Lime)

Type A Hydrated Lime shall consist of a dry powder obtained by treating quicklime with enough water to satisfy its chemical affinity for water under the conditions of its hydration. This material shall consist essentially of calcium hydroxide or a mixture of calcium hydroxide and a small allowable percentage of calcium oxide, magnesium oxide and magnesium hydroxide.

When sampled and tested according to prescribed TxDOT Standard Specification Item No. 264, hydrated lime shall conform to the following requirements as to chemical and physical composition:

Chemical Composition Requirements

Total "active" lime content, percent by weight (mass) {i.e., % by weight (mass) [Ca(OH) ₂] + % by weight (mass) [CaO]}	Minimum 90.0 %
Note: No more than 5 % by weight (mass) calcium oxide (unhydrated lime) will be allowed in determining the total 'active' lime content.	
Unhydrated lime content, % by weight (mass), CaO	Maximum 5.0 %
"Free water" content, % by weight (mass), H ₂ O	Maximum 5.0 %t

The percent by weight (mass) of residue retained, wet sieve, shall conform to the following requirements:

Wet Sieve Requirements

Residue retained on No. 6 (3.35 mm) sieve	Maximum. 0.2 %
Residue retained on No. 30 (600 μm) sieve	4.0 %

Specifications for Type A applies specifically to the normal hydrate of lime made from "high-calcium" type limestone. Hydrated Lime for stabilization purposes shall be applied as a dry powder or mixed to form a slurry before application as indicated on the Drawings. The slurry shall be free of liquid other than water.

B. Type B (Commercial Lime Slurry)

Type B Lime Slurry shall be a pumpable suspension of solids in water. The slurry shall be furnished at or above the minimum "Dry Solids" content as approved by the Engineer or designated representative and must be of a consistency that can be handled and uniformly applied without difficulty. The water of the liquid portion of the slurry shall not contain dissolved material in sufficient quantity and/or nature to make it injurious or objectionable for the purpose intended. The solids portion of the mixture, when considered on the basis of "solids content", shall consist principally of hydrated lime of a quality and fineness sufficient to meet the requirements as to chemical composition and residue identified below.

When sampled and tested according to prescribed TxDOT Standard Specification Item No. 264, hydrated lime shall conform to the following requirements as to chemical and physical composition:

1. Chemical Composition. The "solids content" of lime slurry shall have a hydrate alkalinity Ca(OH)_2 of not less than 87 percent by weight (mass).
2. Residue (Wet Sieve)

The percent by weight (mass) of residue retained in the "solids content" of lime slurry shall conform to the following requirements:

Residue retained on No. 6 (3.35 mm) sieve	Maximum 0.2 %
Residue retained on No. 30 (600 μm) sieve	Maximum 4.0 %.

C. Type C: Quicklime Pellets

Quicklime pellets shall conform to TxDOT Grade DS (TxDOT Specification Item 264) and are only allowable when indicated on the Drawings or when approved by the Engineer or designated representative. Quicklime pellets shall be of a gradation suitable for either "Dry Placing" or for preparation of a slurry for "Wet Placing".

When sampled and tested according to prescribed TxDOT Standard Specification Item No. 264, the quicklime lime shall conform to the following requirements as to chemical and physical composition:

1. Chemical Composition. The "solids content" of lime slurry shall have a hydrate alkalinity CaO of not less than 87 percent by weight (mass).
2. Residue (Wet and Dry Sieve)

The percent by weight (mass) retained in the "solids content" of quicklime shall conform to the following requirements:

Wet Sieve Requirements

Residue retained on No. 6 (3.35 mm) sieve	Maximum 8.0 %
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Dry Sieve Requirements

Retained on 1 inch (25 mm) sieve	0.0 %
Retained on 3/4 inch (19 mm) sieve	Maximum of 10.0 %
Retained on No. 100 (150 μm) sieve	Minimum of 80.0 %

D. Water

Water shall be clean and free of industrial wastes and other objectionable substances harmful to the lime and the environment.

202S.4 Sampling and Testing

The sampling and testing of lime slurry shall be conducted in accordance with TxDOT Test Methods: Tex-112-E, Tex-121-E and Tex-600-J.

202S.5 Measurement and Payment

Lime will be measured and paid for in accordance with the governing specifications for the items of construction in which lime is used (e.g. Standard Specification Item 203S, "Lime Treatment for Materials in Place"), except that lime treatment for small applications required to stabilize a problem area shall be paid per pound (kilograms: 1 kilogram equals 2.205 pounds) applied. The unit bid price for small applications shall include full compensation for all spreading, mixing and shaping required to stabilize the surface and for any other materials, manipulation, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under the following:

- Pay Item No. 202S-A:** Small Area Application of Hydrated Lime, Type A Per Pound.
- Pay Item No. 202S-B:** Small Area Application of Lime Slurry, Type B Per Pound.
- Pay Item No. 202S-C:** Small Area Application of QuickLime, Type C Per Pound.

End

<u>SPECIFIC</u> Cross Reference Materials
Specification Item 202S, "Hydrated Lime and Lime Slurry"

City of Austin Standard Specification Items

<u>Designation</u>	<u>Description</u>
Item No. 203S	Lime Treatment for Materials in Place

Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

<u>Designation</u>	<u>Description</u>
Item No. 264	Lime and Lime Slurry

Texas Department of Transportation: Manual of Testing Procedures

<u>Designation</u>	<u>Description</u>
Tex-112-E	Methods of Admixing Lime to Reduce Plasticity Index of Soils
Tex-121-E	Soil Lime Testing
Tex-600-J	Sampling and Testing of Hydrated Lime, Quicklime and Commercial Lime Slurry

<u>RELATED</u> Cross Reference Materials

City of Austin Standard Specifications

<u>Designation</u>	<u>Description</u>
Item No. 101S	Preparing Right of Way
Item No. 110S	Street Excavation
Item No. 111S	Excavation
Item No. 130S	Borrow
Item No. 132S	Embankment
Item No. 210S	Flexible Base
Item No. 236S	Proof Rolling

Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

<u>Designation</u>	<u>Description</u>
Item No. 100	Preparing Right of Way
Item No. 110	Excavation
Item No. 112	Subgrade Widening
Item No. 132	Embankment
Item No. 150	Blading
Item No. 158	Specialized Excavation Work
Item No. 204	Sprinkling
Item No. 210	Rolling (Flat Wheel)
Item No. 211	Rolling (Tamping)
Item No. 213	Rolling (Pneumatic Tire)

Texas Department of Transportation: Manual of Testing Procedures

<u>Designation</u>	<u>Description</u>
Tex-103-E	Determination of Moisture Content of Soil Materials
Tex-104-E	Determination of Liquid Limit of Soils
Tex-105-E	Determination of Plastic limit of Soils
Tex-106-E	Method of Calculating the Plasticity Index of Soils
Tex-114-E	Laboratory Compaction Characteristics & Moisture Density Relationship of Subgrade and Soil
Tex-115-E	Field Method for Determination of In-Place Density of Soils & Base Materials