

## SUPPORTED TEST STANDARDS

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The LASTRADA platform includes a module for custom test methods, which allows users to support tests which are not yet implemented in LASTRADA.

## Aggregates

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- Tests for general properties of aggregates
  - Procedure and terminology for simplified petrographic description
- Tests for geometrical properties of aggregates
  - Determination of particle size distribution - Sieving method
  - Determination of particle shape - Flakiness index
  - Determination of particle shape - Shape index
  - Determination of percentage of crushed and broken surfaces in coarse aggregate particles
  - Assessment of surface characteristics - Flow coefficient of aggregates
  - Determination of shell content - Percentage of shells in coarse aggregates
  - Assessment of fines - Sand equivalent test
  - Assessment of fines - Methylene blue test
  - Assessment of fines - Grading of fillers (air jet sieving)
- Determination of fineness (Blaine) (filler test)
- Calcium carbonate content (filler test)
- Calcium hydroxide content (filler test)
  - Classification test for the constituents of coarse recycled aggregate
  - Determination of the resistance to wear (micro-Deval)
  - Methods for the determination of resistance to fragmentation
  - Determination of loose bulk density and voids
  - Determination of the voids of dry compacted filler
  - Determination of the water content by drying in a ventilated oven
  - Determination of particle density and water absorption
  - Determination of the particle density of filler (Pycnometer method)
  - Determination of the polished stone value
  - Determination of the resistance to wear by abrasion from studded tyres - Nordic test
  - Determination of resistance to freezing and thawing
  - Magnesium sulfate test
  - Boiling test for "Sonnenbrand basalt"
  - Determination of drying shrinkage
  - Determination of resistance to thermal shock
  - Determination of resistance to freezing and thawing in the presence of salt (NaCl)
  - Chemical analysis
  - Determination of acid soluble chloride salts
  - Natural stone test methods - Determination of compressive strength
  - Natural stone test methods - Determination of resistance to salt crystallisation
  - Delta ring and ball test (fillers)
  - Bitumen number (fillers)
  - Test method for the determination of California bearing ratio, immediate bearing index and linear swelling
- Organic Impurities in Fine Aggregates for Concrete
- Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate
- Materials Finer than 75- $\mu$ m (No. 200) Sieve in Mineral Aggregates by Washing
- Standard Test Method for Lightweight Particles in Aggregate
- Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
- Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
- Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- Sieve Analysis of Fine and Coarse Aggregates
- Clay lumps and friable particles content
- Potential Alkali-Silica Reactivity of Aggregates (Chemical Method)
- Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- California Bearing Ratio of Laboratory-Compacted Soils
- Determination of Water Content of Soil and Rock by Mass

- Sand Equivalent Value of Soils and Fine Aggregate
- Unconfined Compressive Strength of Intact Rock Core
- Determination of Tensile Splitting Strength of Rock
- Splitting Tensile Strength of Intact Rock Core Specimens
- Slake Durability Test
- Determination of the Point Load Strength Index of Rock
- Methods of determination of density
- Sieve Analysis
- Determination of Particle Shape - Flakiness Index (FI)
- Determination of Particle Shape - Elongation Index of Coarse Aggregate
- Determination of Shell Content in Coarse Aggregate
- Determination of Moisture Content
- Determination of Aggregate Crushing Value (ACV)
- Determination of Ten Per Cent Fines Value (TFV)
- Determination of Aggregate Impact Value (AIV)
- Determination of Water-Soluble Chloride Salts
- Determination of Sulphate Content
- Soils for civil engineering purposes
  - Particle Size Distribution
  - Classification tests
  - Chemical and electro-chemical tests
  - Compaction related tests
- Tests for thermal and weathering properties of aggregates
  - Magnesium sulfate test (Annex B)
  - Determination of drying shrinkage
- Determination of the voids content on dry compacted filler (Rigden)
- Drop Test
- Immersed Rotational Test
- Static Compressive Strength of Aggregates

## Asphalt

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- Bituminous mixtures - Test methods for asphalt
  - Soluble binder content
  - Determination of particle size distribution
  - Bitumen recovery: Rotary evaporator
  - Bitumen recovery: Fractionating column
  - Determination of the maximum density
  - Determination of bulk density of bituminous specimens
  - Determination of void characteristics of bituminous specimens
  - Compactability
  - Determination of the affinity between aggregate and bitumen
  - Determination of the water sensitivity of bituminous specimens
  - Temperature measurement
  - Water content
  - Abrasion by studded tyres
  - Particle loss of porous asphalt specimen
  - Binder drainage
  - Permeability of specimen
  - Indentation using cube or Marshall specimens
  - Indentation using plate specimens
  - Wheel tracking

- Determination of the indirect tensile strength of bituminous specimens
- Cyclic compression test
- Sampling
- Preparation of samples for determining binder content, water content and grading
- Determination of the dimensions of a bituminous specimen
- Specimen preparation by impact compactor
- Specimen prepared by roller compactor
- Marshall test
- Laboratory mixing
- Determination of the thickness of a bituminous pavement
- Hot sand test for the adhesivity of binder on precoated chippings for HRA
- Binder content by ignition
- Binder drainage, Schellenberg method
- Binder content
- Particle size distribution
- Bitumen recovery
- Maximum density
- Bulk density
- Void characteristics
- Affinity between aggregate and bitumen
- Water sensitivity
- Temperature measurement
- Water content
- Particle loss
- Binder drainage
- Indentation
- Wheel tracking
- Indirect tensile strength
- Sampling
- Preparation of samples
- Dimensions
- Specimen preparation
- Specimen prepared by roller compactor
- Marshall test
- Laboratory mixing
- Shear test
- Effect of moisture on asphalt concrete paving mixtures
- Polycyclic aromatic hydrocarbons (PAH 16)

## Asphalt Binders

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- Crude petroleum and liquid or solid petroleum products
- Bitumen and bituminous binders
  - Characterization of perceptible properties
  - Determination of needle penetration
  - Determination of softening point - Ring and Ball method
  - Determination of residue on sieving of bituminous emulsions, and determination of storage stability by sieving
  - Determination of residual binder and oil distillate from bitumen emulsions by distillation
  - Determination of solubility
  - Determination of the Fraass breaking point
  - Determination of kinematic viscosity
  - Determination of dynamic viscosity by vacuum capillary

- Determination of the resistance to hardening under the influence of heat and air
- Determination of efflux time by the efflux viscometer
- Recovery of binder from bituminous emulsion or cut-back or fluxed bituminous binders
- Determination of breaking behaviour
- Determination of the elastic recovery of modified bitumen
- Determination of storage stability for modified binders
- Determination of the tensile properties of modified bitumen by the force ductility method
- Determination of adhesivity of bituminous emulsions by water immersion test
- Determination of complex shear modulus and phase angle - Dynamic Shear Rheometer (DSR)
- Determination of the flexural creep stiffness - Bending Beam Rheometer (BBR)
- Determination of ductility
- Multiple stress creep and recovery test of Asphalt Binder (MSCR)
- Determination of density or relative density
- Viscosity (Saybolt Furol): flowing time
- Paddle Viscometer: Viscosity
- Storage stability difference in residue
- Target f particle charge
- Sieving residue
- Demulsibility
- Cement mix text: Residue
- Distillation residue
- Distillation – oil distillate
- Tests on distillation residue
- Needle penetration
- Ductility
- Solubility
- Elastic recovery

## Chemical Tests

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LASTRADA includes an extensive library of chemical tests that cover the areas listed below.

- Water
- Waste Paint
- Environmental Contaminates
- Oil
- Available upon request

## Concrete

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- Slump test
- Vebe test
- Degree of compatibility
- Flow table test
- Density
- Air content
- Unit weight
- Temperature
- Ball penetration

- Self-compacting concrete - Slump-flow test
- Self-compacting concrete - V-funnel test
- Self-compacting concrete - Sieve segregation test

## *Hardened Concrete Test Standards*

- Compressive Strength of Cylindrical Concrete Specimens
- Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
- Flexural Strength of Concrete (Using Simple Beam with Center-Point Loading)
- Water absorption and volume of permeable voids including sample preparation
- Dry and Wet Bulk Density, Water Absorption, and Apparent Porosity of Thin Sections of Glass-Fiber Reinforced Concrete
- Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration
- Compressive strength, density and visual examination and preparation, of drilled concrete cores
- Determination of Water Absorption
- Determination of Chloride Content
- Determination of Sulphate Content
- Recommendations for the Determination of the Initial Surface Absorption of Concrete
- Initial surface absorption test (ISAT)
- Water permeability
- Freeze/thaw cycle performance
- Hydraulic conductivity/porosity
- Chloride resistance
- Freeze/De-icing Salt Resistance
- Sulphate resistance
- Shrinkage
- Swell
- Alkali-aggregate reaction (AAR)
- Alkali-silica-reaction
- Chloride migration
- Freeze/De-icing Salt Resistance
- Freeze-Thaw Resistance
- Heat of hydration
- Carbonatisation
- Mercury intrusion porosimetry
- Shrinkage/Swell
- Water absorption
- Chloride Migration

## *Test Standard for Concrete Structures*

- Non-destructive testing - Determination of rebound number

## *Cement Test Standards*

- Determination of strength
- Chemical analysis of cement
  - Loss on ignition
  - Loss on ignition (corrected)
  - Determination of residue insoluble

- Determination of sulfide
- Main constituents
- Chloride
- Alkali reactivity (Reference method)
- Chemical X-ray fluorescence analysis
- Determination of setting time and soundness
- Pozzolanicity test for pozzolanic cement
- Determination of fineness; Determination of density (Annex NC)
- Heat of Hydration, Methylene Blue Analysis, Available Lime
- Determination of the water-soluble chromium (VI) content of cement
- Masonry Cement - Air Content and Water Retention
- Tests for geometrical properties of aggregates. Determination of particle size distribution. Sieving method
- Methods of test for mortar and screed. Chemical analysis and physical testing cement content
- Methods of test for mortar for masonry - Determination of air content of fresh mortar
- Determination of Carbon Dioxide
- Determination of total organic carbon in limestone
- Tricalcium Aluminate
- Tetracalcium Aluminoferrite
- Dicalcium Silicate
- Tricalcium Silicate
- Standard Test Method for Early Stiffening of Hydraulic Cement (Mortar Method)

## Drilled Cores

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- Compressive Strength
- Tensile Strength
- Tensile Splitting Strength
- Static Modulus of Elasticity
- Shear Strength
- Water Penetration Depth
- Water Absorption at Atmospheric Pressure
- Water Absorption under Vacuum and at 150 bar
- Freeze Test
- Freeze-Thaw Test
- Chemical Analysis
- Visual Inspection (Concrete)
- Visual Inspection (Masonry)
- Compressive Strength + Water Absorption at Atmospheric Pressure
- Tensile Splitting Strength + Water Absorption at Atmospheric Pressure

## Geotextiles

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- Determination of thickness at specified pressures (Method A)
- Determination of mass per unit area
- Wide-width tensile test
- Identification on site
- Determination of water permeability characteristics normal to the plane, without load
- Static puncture test (CBR test)
- Determination of the characteristic opening size
- Determination of water flow capacity in their plane

- Strength of internal structural junctions
- Abrasion damage
- Dynamic perforation test
- Determination of the resistance to weathering
- Determination of the microbiological resistance by a soil burial test
- Determination of the resistance to acid and alkaline liquids
- Determination of the mechanical filter efficiency compared to silty soils and fine-graded soils
- Hydraulic filter efficiency
- Water permeability in the condition as received (TX DE ST U0)
- Water permeability after the turbulence test

## Sealing Products/Systems

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- Measurement of bond strength by pull-off
  - Test methods for products and systems for the protection and repair of concrete structures
  - Methods of test for screes materials: Determination of bond strength
  - Bitumen jointing: Measurement of bond strength by pull-off

## Soil / Geotechnical

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- Determination of Density, Specific Gravity, Compaction Degree, Balloon Method, Soil Core Sampler, Sand Substitute Method, Liquid Substitute Method, Nuclear Proctor Test
- Sieving and Sedimentation
- Plate Bearing Test
- Dynamic Probing
- California Bearing Ratio
- Water Permeability
- Soil Profiles
- Atterberg Tests
- Water Soluble Sulphate Content
- Acid Soluble Sulphate Content
- Acid Soluble Chloride Content
- Organic Matter Content
- Soil Groups

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