

Physical Testing Laboratory

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The Materials and Tests Unit is responsible for establishing acceptance criteria for materials and manufactured products to be incorporated into the North Carolina Highway System and insuring that these materials and manufactured products meet these criteria and function as intended. The Physical Testing Sub-unit is responsible for determining and evaluating the physical quality of various materials used on the State Highway System. The Sub-unit receives samples for testing from field inspectors, contractors, manufacturers and producers. The Sub-unit also reviews and assigns all concrete mix designs used throughout the State in structures and pavement. The most common materials submitted to the lab for testing are:

- **Concrete Cylinders** – Compressive strength.
- **Fine Aggregate** – Sieve analysis, absorption, unit weight, specific gravity, soundness, strength, organic impurities.
- **Coarse Aggregate**- Sieve analysis, Los Angeles abrasion, absorption, specific gravity, deleterious substance, soundness.
- **Cement** – Compressive strength of mortar, fineness by air permeability, fineness by sieving over #325, soundness by autoclave expansion, normal consistency, setting time by Gillmore needles.
- **Fly Ash** – Fineness by air permeability, specific gravity.
- **Slag** - Fineness by sieving over #325 mortar strength.
- **Water for Concrete** – Mortar strength.
- **Concrete Block** – Compressive strength, absorption, dimensions.
- **Concrete Cores** – Depending on the type of core, thickness, compressive strength, bond strength, absorption.
- **Rock Cores** – Compressive strength, modulus, unit weight.
- **Reinforcing Steel** – Tensile strength, yield strength elongation, unit weight.
- **Reinforcing Steel Bar Supports** – Tensile strength, dimensions.
- **Wire Fabric** – Tensile strength of wire and weld.
- **Nuts, Bolts, and Washers** – Hardness, rotational capacity, tensile strength.
- **DTI** – Compressive loads.
- **Grey Iron Castings** – Tensile strength.
- **Prestress Cable** – Proof load.
- **Guard Rail Cable** – Proof load.
- **Guide Rail Cable** – Proof load.
- **Aluminum** – Tensile strength.
- **Pipe Steel** – Tensile strength.
- **Structural Steel** – Tensile strength, elongation, Charpy V-notch impact.
- **Plastic Pipe** – Compressive strength, elongation, dimensions.
- **Plastic Pipe Resin** – Density, melt index.
- **Neoprene** – Shore hardness, tensile elongation, tensile strength.
- **Curing Compound** – Water retention, nonvolatile content.
- **Epoxy** – Compressive strength of 2-inch mortar cubes.
- **Concrete Admixtures** – Review of manufacturer's certified test data.