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  - (a) Formed Corrugations
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  - (a) Mixture
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- 408.02 Mixing Plant
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    - 2. Proportioning Systems
    - 3. Material Storage
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    - 4. Aggregate Feed System
    - 5. Drier Unit
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    - 8. Mix Load-out Scales
    - 9. Hot Surge Bins
    - 10. Sampling Point Requirements
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- (b) Hauling Equipment
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- (d) Compaction Equipment
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  - 3. Pneumatic Tire Roller
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  - 1. Aggregate Spreader
  - 2. Rotary Power Broom
- (f) Smoothness Equipment
  - 1. Profilograph
  - 2. Straightedge 4.9 m (16 ft)
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SECTION 410 -- Blank

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- 501.25 Pavement Smoothness
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- 910.11 Guardrail Accessories, Fittings, and Hardware
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    - 4. Timbers
    - 5. Timbers, Round
    - 6. Yard Lumber
    - 7. Surfaced or Dressed Lumber
    - 8. Rough Lumber
  - (b) Species and Grade
  - (c) Inspection
  - (d) Tolerances
  - (e) Untreated Piling
- 911.02 Treated Lumber
  - (a) General
  - (b) Bridge Lumber
  - (c) Piling
  - (d) Guardrail Posts, Braces, and Battens
  - (e) Sign Posts
  - (f) Sawed Timber Posts and Blocks for Thrie-Beam and W-Beam Guardrail
    - 1. Species and Grades
    - 2. Department Grade GRP
      - a. Splits
      - b. Checks
      - c. Shakes
      - d. Stains
      - e. Slope of Grain
      - f. Wane

## Section Title

- g. Knots
- 3. Department Grade GRB
  - a. Splits
  - b. Checks
  - c. Shakes
  - d. Stains
  - e. Wane
  - f. Knots
- 4. General Requirements
  - a. Decay
  - b. Unsound Wood
  - c. Crook or Bow
  - d. Dimensional Tolerances
- 5. Pressure Treating Posts and Blocks
  - a. Machining
  - b. Blank
  - c. Inspection Before Treatment
  - d. Test for Moisture Content
  - e. Preservative Treatment
  - f. Material for Preservative Treatments
  - g. Treatment Methods
  - h. Sorting and Spacing
  - i. Conditioning
  - j. Treatment
  - k. Inspection During Treatment
  - l. Retentions
  - m. Penetration
  - n. Inspection After Treatment
  - o. Branding
  - p. Conformance
  - q. Records
  - r. Independent Inspections
- 6. Field Treatment of Posts and Blocks
- 7. Rejection for Degrade After Treatment
- (g) Preservatives
  - 1. Waterborne Preservatives

## SECTION 912 -- CONCRETE CURING MATERIALS AND ADMIXTURES

# 912.01 Curing Materials

- (a) Burlap Cloth made from Jute or Kenaf
- (b) Waterproof Paper Blankets
- (c) White Polyethylene Sheeting, Film
- (d) White Burlap Polyethylene Sheet
- (e) Liquid Membrane Forming Compounds
- (f) Polyethylene Film.
- 912.02 Curing-Sealing Materials
- 912.03 Admixtures for Use in Concrete
  - (a) Air Entraining Admixtures
  - (b) Chemical Admixtures for Concrete
    - 1. Type A
    - 2. Type B
    - 3. Type C
    - 4. Type D
    - 5. Type E
    - 6. Type F
    - 7. Type G
    - 8. High Range Water Reducing and High Range Water Reducing and Retarding Admixture Systems

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- (c) Certification
- (d) Approved Admixtures
- (e) Performance of Admixtures
- 912.04 Latex Modifiers

### SECTION 913 -- MISCELLANEOUS

- 913.01 Water
- 913.02 Calcium Chloride
- 913.03 Sodium Chloride
- 913.04 Lime
  - (a) Hydrated Lime for Masonry
  - (b) Lime for Soil Modification
    - 1. Hydrated Lime and Quicklime
    - 2. Lime By-Products
- 913.05 Precast Concrete Curbing
- 913.06 Precast Concrete Units Not Otherwise Covered
- 913.07 Flexible Delineator Posts
- 913.07.1 Flexible Channelizer and Flexible Tubular Marker
- 913.08 Delineators
  - (a) Acrylic Plastic Delineators
  - (b) Reflective Sheeting Delineators
  - (c) Barrier Delineators
- 913.09 Glass Beads
- 913.10 Traffic Signs
  - (a) Sheet Signs
  - (b) Panel Signs
  - (c) Flexible Roll-Up Prismatic Reflective Sign
    - 1. Reflectivity
    - 2. Color
    - 3. Sheeting
    - 4. Durability
    - 5. Impact Resistance
    - 6. Sign Face Backing Fabric
    - 7. Cross Brace Assembly and Attaching Fasteners
    - 8. General Characteristics and Packaging
    - 9. Basis of Use
  - (d) Reflective Sheeting
    - 1. General
      - a. Reflectivity
      - b. Color
      - c. Adhesive
      - d. Sheeting
      - e. Durability
      - f. Impact Resistance
      - g. General Characteristics and Packaging
    - 2. Enclosed Lens, Engineer Grade, and Super Engineer Grade, Reflective Sheeting
      - a. Reflectivity
      - b. Color
      - c. Adhesive
      - d. Sheeting
      - e. Durability
      - f. Impact Resistance
      - g. General Characteristics and Packaging

- 3. Encapsulated Lens, High Intensity, Reflective Sheeting
  - a. Reflectivity
  - b. Color
  - c. Adhesive
  - d. Sheeting
  - e. Durability
  - f. Impact Resistance
  - g. General Characteristics and Packaging
- 4. Flexible Encapsulated Lens Reflective Sheeting, High Intensity
  - a. Reflectivity
  - b. Color
  - c. Adhesive
  - d. Sheeting
  - e. Durability
  - f. Impact Resistance
  - g. General Characteristics and Packaging
- 5. Prismatic Lens, High Intensity, Reflective Sheeting
  - a. Reflectivity
  - b. Color
  - c. Adhesive
  - d. Sheeting
  - e. Durability
  - f. Impact Resistance
  - g. General Characteristics and Packaging
- 6. Prismatic Lens, Super High Intensity, Reflective Sheeting
  - a. Reflectivity
  - b. Color
  - c. Adhesive
  - d. Sheeting
  - e. Durability
  - f. Impact Resistance
  - g. General Characteristics and Packaging
- (e) Letters, Numerals, Symbols, and Accessories
  - 1. Embossed Reflective Sheeting Type
  - 2. Acrylic Plastic Type
- (f) Fiberglass Reinforced Plastic Sign Panels
  - 1. Mechanical Properties
  - 2. Physical Properties
    - a. Thickness
    - b. Length and Width
      - (1) Panel Length of 3660 mm (144 in.) or Less
      - (2) Panel Length Exceeding 3660 mm (144 in.)
      - (3) Panel Width of 3660 mm (144 in.) or Less
    - c. Squareness
    - d. Weather Resistance
    - e. Fire Resistance
    - f. Impact Resistance
    - g. Coefficient of Linear Thermal Expansion
    - h. Panel Smoothness
    - i. Flatness
      - (1) Test Purpose
      - (2) Test Procedure
    - j. Color
- (g) Samples and Tests
  - 1. Reflective Sheeting
  - 2. Traffic Signal Materials

- 913.11 Highway Illumination Materials
  - (a) Lighting Standards and Mast Arms, under 80 feet (24.4 m)
    - 1. General Requirements
    - 2. Aluminum Lighting Standards
      - a. Round Seamless
      - b. Single Longitudinal Welded
    - 3. Stainless Steel Lighting Standards
    - 4. Galvanized Steel Lighting Standards
    - 5. Wood Pole Lighting Standards
    - 6. Frangible Breakaway Bases
      - a. Cast Aluminum Transformer Base
      - b. Breakaway Coupling
    - 7. Anchor Bolts
  - (b) High Mast Standards of 24.5 m (80 ft) and Over
    - 1. High Mast Poles
    - 2. Welding
    - 3. Handholes
    - 4. Luminaire Ring Assembly
    - 5. Head Frame Assembly
    - 6. Winch Assembly
    - 7. External Drive System
    - 8. Cable Terminator
    - 9. Lightning Rod Assembly and Grounding System
    - 10. Anchor Bolts
  - (c) Wire and Cable
    - 1. Polyethylene Conduit
    - 2. Conductors in Cable-Duct
    - 3. Lighting Standard Circuit Wiring
    - 4. Sign and Underpass Wiring
    - 5. Aerial Cable
    - 6. High Mast Tower Luminaire Ring Conductors
    - 7. Power Cable-High Mast Poles
    - 8. Electrical Connectors
  - (d) Luminaires
    - 1. General Requirements
    - 2. Roadway Lighting Luminaires
    - 3. Sign Luminaires
    - 4. Underpass Luminaires
    - 5. High Mast Luminaires
  - (e) Circuit Breakers and Enclosure
    - 1. Circuit Breakers for Type II Service Point
    - 2. Circuit Breakers for Sign and Underpass Circuits
    - 3. Circuit Breakers for High Mast Poles
    - 4. E-Series Magnetic Circuit Breakers
  - (f) Multiple Relay Switches with Photocell Receptacles
  - (g) Shop Drawings
  - (h) Materials Certification
- 913.12 Construction Warning Lights
  - (a) Flash Requirements
    - 1. Flash Rate
    - 2. On-Time
      - a. Type A
      - b. Type B
  - (b) Optical Requirements
    - 1. Effective Intensity
    - 2. Lens Illumination
    - 3. Reflex-Reflective Performance
    - 4. Testing Procedure

- (c) Lens Requirements
  - 1. Size of Lens
  - 2. Directional Lenses
  - 3. Lens Chromaticity
  - 4. Lens Luminous Transmittance
  - 5. Lens Material
- (d) Head and Case
  - 1. Swivel Head
  - 2. Case
- (e) Photoelectric Controls
- 913.13 Flashing Arrow Sign
  - (a) Solar Powered
  - (b) Diesel Powered
  - (c) AC Powered
- 913.13.1 Temporary Worksite Speed Limit Sign Assembly
- 913.14 Pavement Marking Material
  - (a) Traffic Paint
  - (b) Durable Marking Material
    - 1. Thermoplastic
      - a. Material Requirements
        - (1) Reflectorization
        - (2) Set Time
        - (3) Water Absorption
        - (4) Softening Point
        - (5) Specific Gravity
        - (6) Impact Resistance
        - (7) Low Temperature Stress Resistance
        - (8) Bond Strength
        - (9) Hardness
      - b. Packaging
      - c. Basis for Use
    - 2. Preformed Plastic
      - a. Material Requirements
        - (1) Tensile Strength
        - (2) Adhesive Stability Test
        - (3) Adhesive Shear Strength
        - (4) Bend Test
      - b. Packaging
      - c. Basis For Use
    - 3. 100 Percent Solids Epoxy
      - a. Material Requirements
        - (1) Glass Beads
        - (2) Abrasion Resistance
        - (3) Hardness
        - (4) Tensile Strength
        - (5) Compressive Strength
        - (6) Weather Resistance
        - (7) Laboratory Drying Time
        - (8) Viscosity
      - b. Materials Preparation
      - c. Packaging and Storage
      - d. Basis For Use
  - (c) Temporary Pavement Marking Tape

- (d) Raised Pavement Marker
  - 1. Snowplowable Raised Pavement Marker
    - a. Prismatic Reflector
      - (1) Optical Performance
      - (2) Seal Test
      - (3) Heat Resistance Test
      - (4) Strength Test
      - (5) Impact Test
      - (6) Temperature Cycling Test
      - (7) Adhesive Tensile Strength Test
      - (8) Basis for Use
    - b. Cast Metal Base
      - (1) Epoxy Adhesive
      - (2) Basis for Use
    - c. Precast Cement Concrete Base
      - (1) Adhesive for Precast Concrete Base
      - (2) Packaging
      - (3) Basis for Use
  - 2. Temporary Raised Pavement Marker
    - a. Optical Requirements
    - b. Strength Requirements
    - c. Adhesive
    - d. Acceptance Evaluation
    - e. Basis for Use
- 913.15 Traffic Signal Materials and Equipment
  - (a) Traffic Signal Controller and Cabinet
    - 1. Model Approval
    - 2. Controllers or Control Units Furnished and Installed by the Contractor
    - 3. Blank
    - 4. Bench Testing
    - 5. Pretimed Solid State Digital Controller
      - a. General
      - b. Controller Requirements
      - c. Spare Modules
      - d. Controller Enclosure
      - e. Power Requirements
      - f. Certification of Traffic Control Units
      - g. Warranty
    - 6. Traffic Actuated Solid State Digital Controller
      - a. General
      - b. Controller Requirements
      - c. Spare Modules
      - d. Controller Enclosure
      - e. Power Requirements
      - f. Certification of Traffic Control Units
        - (1) Certification of a Production Run Model
        - (2) Certification of Environmental Testing
      - g. Warranty
    - 7. Cabinet Requirements for Traffic Signal Controllers
      - a. General
      - b. G Cabinet
        - (1) Cast Aluminum Pedestal Base
        - (2) Pedestal Pole
        - (3) Pole Cap
      - c. M Cabinet
      - d. P-1 Cabinet

- 8. Two Circuit Alternating Flasher
  - a. General
  - b. Cabinet Requirements
- (b) Interconnection Equipment.
  - 1. Hardwire Interconnection
    - a. Electro-Mechanical Dial Coordination Unit
      - (1) General
      - (2) Additional Requirements for Master Locations
      - (3) Additional Requirements for Secondary Locations
- (c) Blank
- (d) Signal Head Components
  - 1. Vehicle Signal Face
    - a. General
    - b. Housing, Door, and Visor
    - c. Lens
    - d. Reflector Assembly
    - e. Lamp Receptacle and Wiring
    - f. Section Coupling
    - g. Terminal Block
    - h. Material Requirements
      - (1) Polycarbonate Signal Head
      - (2) Die-Cast Aluminum Signal Head
    - i. Certification
  - 2. Pedestrian Signal Head
    - a. Housing, Door, and Visor
    - b. Optical Unit
    - c. Lens
    - d. Message
    - e. Reflector Assembly
    - f. Light Distribution
    - g. Electrical
  - 3. Disconnect Hanger Junction Box
  - 4. Signal Bulbs
  - 5. Free Swinging Signal Support Assemblies
  - 6. Mid-Mast Arm Mount Signal Bracket
- 7. Pedestal Mounted Control Cabinets or Pedestrian Signal Heads
- (e) Signal Support
  - 1. Steel Strain Pole
    - a. Maximum Load 35.6 kN (8000 lbs)
  - 2. Wood Strain Pole
  - 3. Signal Cantilever Structures
    - a. General
    - b. Signal Support
    - c. Combination Signal-Luminaire Support
    - d. Pole Requirements
      - (1) General
      - (2) Deflection
      - (3) Materials
      - (4) Hardware
      - (5) Anchor Base
    - e. Arm Requirements
      - (1) Signal Cantilever Arm
      - (2) Luminaire Mast Arm for Combination Support
      - (3) Materials
    - f. Anchor Bolts
    - g. Finish
    - h. Certification
    - i. Shop Drawings

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- 4. Downguys, Anchors, Rods, and Guards
- (f) Messenger Cable
  - 1. Messenger Cable
  - 2. Span, Catenary, and Downguy Cable
  - 3. Tether and Support Cable
  - 4. Cable Hardware
    - a. Messenger Hangers
    - b. Cable Ring
    - c. Clamps
    - d. Servi-Sleeves
    - e. Straight Eye-Bolts
    - f. Hub-Eyes
  - 5. Signal Cable
    - a. Hook-up Wire
    - b. Signal Control Cable
    - c. Integral Messenger Interconnect Cable
    - d. 6 Pair/19 Telemetry Cable
    - e. Fiber Optic Interconnect Cable
    - f. Service Cable
    - g. Detection Wire and Sealant
      - (1) Loop Detector Lead-in Cable
      - (2) Roadway Loop Wire
      - (3) Sealant
    - h. Ground Wire
    - i. Splicing Kit
- (g) Ground Rod and Connections
- (h) Castings for Handholes
- (i) Entrance Switch
- (j) Conduit and Fittings
  - 1. Steel Conduit
  - 2. Polyvinyl Chloride Conduit
- (k) Detector Housing
- (l) Certification
- 913.16 Fabric for Waterproofing
- 913.17 Packaged, Dry, Combined Materials for Mortar and Concrete
- 913.18 Geotextile for Use Under Riprap
- 913.19 Geotextile for Use with Underdrains
- 913.20 Geotextile for Silt Fence
- 913.21 Geogrid for Stabilization or Modification

# SECTION 914 -- ROADSIDE DEVELOPMENT MATERIALS

- 914.01 Special Topsoil for Roadside Development
- 914.02 Blank
- 914.03 Fertilizer
- 914.04 Grass and Legume Seed
- 914.05 Mulch
  - (a) Mulch for Seeding
    - 1. Excelsior Mulch
    - 2. Wood Cellulose Fiber
    - 3. Excelsior Blanket
    - 4. Paper Mat
    - 5. Straw Mat
  - (b) Mulch for Plants
- 914.06 Leguminous Inoculants
- 914.07 Sod

## Section Title

- 914.08 Plant Materials
  - (a) Quality of Plant Materials
  - (b) Plant Names
  - (c) Substitutions
  - (d) Grading Standards
  - (e) Nursery Inspection and Plant Quarantine
  - (f) Balled and Burlapped Plants
  - (g) Container Grown Plants
  - (h) Bare Rooted Plants
  - (i) Collected Plants
  - (j) Forms, Shapes, and Condition of Plants
  - (k) Inspection
  - (l) Shipment
  - (m) Certification
- 914.09 Miscellaneous Material
  - (a) Water
  - (b) Stakes for Bracing and Anchoring
  - (c) Tree Wound Dressing
  - (d) Porous Material
  - (e) Pipe
  - (f) Staples
  - (g) Plastic Net

#### SECTION 915 -- BRIDGE PILES AND BEARINGS

- 915.01 Steel Shell Encased Concrete Piles and Epoxy Coated Steel Shell Encased Reinforced Concrete Piles
  - (a) General Requirements
  - (b) Fluted Steel Pile Shells
  - (c) Rounded Steel Pipe Shells
  - (d) Epoxy Coating for Piles
    - 1. Prequalification of Organic Coatings for Steel Piles
      - a. Product Data Sheet
      - b. Fingerprint
      - c. Materials Safety Data Sheets
      - d. Laboratory Report
        - (1) Tensile Strength and Elongation
        - (2) Impact Resistance
        - (3) Abrasion Resistance
        - (4) Salt Fog
    - 2. Application
      - a. Surface Preparation
      - b. Coating Application
        - (1) Thickness
        - (2) Cure
        - (3) Continuity of Coating
    - 3. Certification
- 915.02 Steel H Piles and Epoxy Coated Steel H Piles
- 915.03 Wood Piles
- 915.04 Elastomeric Bearings
  - (a) Description
  - (b) Materials
  - (c) Manufacturing Requirements
  - (d) Appearance and Dimensions
  - (e) Quality Assurance
  - (f) Certification

# Section Title

## SECTION 916 -- MATERIALS CERTIFICATIONS

### 916.01 General

# 916.02 Types of Certifications

- (a) Type A
- (b) Type B
- (c) Type C (d) Type D
- (e) Other Types
- (f) Requirements for Small Quantities of Materials
- (g) Buy American Requirement

# 916.03 Sample Forms

- (a) For Buy American Requirement
- (b) Sample Type A Certification Form
- (c) Sample Type B Certification Form (d) Sample Type C Certification Form
- (e) Sample Type D Certification Form
- (f) Sample Asbestos Exclusion Letter

# SECTION 917 -- QUALITY ASSURANCE AGGREGATE CERTIFICATION

- 917.01 General Requirements
- 917.02 Quality Control Plan
- 917.03 Source Approval Requirements
  - (a) Step 1
  - (b) Step 2
  - (c) Step 3
- 917.04 Removal from Certified Producer Status
- **917.05** Appeals