


What's New in WYDOT Specifications



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Concrete and Independent Assurance

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Section 801-Cement & Admixtures

Removal of Low Alkali

- Removed references of Low-Alkali cement
- Cement types – ASTM C150
 - Structural Concrete – Type II or as specified
 - Concrete Pavement – Type I, II or V
 - ASTM C595 Types IL and IP can be accepted on a project basis
 - Hope to have these incorporated for 2023
- Alkali loading
 - ASTM C1778 provides guidance
 - $Na_2O_{eq} = Na_2O + 0.658 K_2O$
 - $(\% Na_2O_{eq} \times \text{Cement Content}) / 100 \leq 4.0 \text{ lb/cy Alkali Loading}$
- Fly Ash
- Blended Cement and Blended Pozzolans
 - Allow for blending to meet requirements of ASTM C618
 - Sulfate Resistance and ASR mitigation

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Mix Design

Section 414 – PCCP (SS-400A)


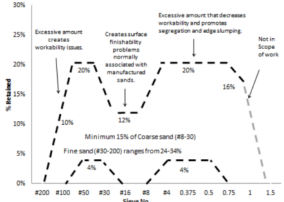
- Cement, Fly Ash, and Slag Cement Contents
 - All Levels of Control: Allow SCM's, minimum 20% replacement of cement with fly ash or slag, allow up to 25% fly ash replacement and 50% slag replacement
 - Require SCM's for Level I if using ASTM C150 cement
 - Levels I, II & III: Reduced minimum cementitious materials content
 - Old: 564 lb/cy to 705 lb/cy, >470 lb/cy w/fly ash
 - NEW: 528 lb/cy to 660 lb/cy
 - Minimum 440 lb/cy cement (for mixes with fly ash)

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Optimized Gradations

Goals for 2023 and Beyond

- Combined Gradations: Tyler Ley's "Tarantula Curve"
- Optimized Gradation for Workability
- Utilize the least amount of paste necessary, allow lower w/c ratios
- Level of Control I PCCP

tarantulacurve.com
optimizedgraded.com

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Texturing

Section 414 – PCCP

Weighted Burlap Drag vs Tined Finish

- Speed > 40mph: Weighted Burlap or Turf, Tining, Diamond Grinding
- Speed < 40mph: Burlap, Artificial Turf, Broom or Tine (transverse)
- **Texture Depth Analysis: 1 test per lane-mile (sand patch)**

Diamond Grinding

- Will not be a specified texture for new pavement due to cost, but is an option of the contractor
- Best option for Smoothness
- **Best utilized for pavement rehabilitation**

Diamond Grooving

- Required on all Bridge Deck overlays
- **Next Generation Concrete Surface**

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Maturity Meters

- ASTM C1074 Strength-Maturity relationship
- **Necessary for use on any installation below 40°F**
- New Special Provision for use on Structures
- New Materials Testing Manual Procedure





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Maturity Meters

Strength-maturity relationship can be expressed in terms of either a Temperature-Time Factor or an Equivalent Age at a specified temperature (ASTM C1074).

Strength, MPa

Temperature-Time Factor, °C-days

$$M(t) = \sum (T_a - T_0) \Delta t$$

Strength, MPa

Equivalent Age at 20 °C, days

$$t_e = \sum e^{-\alpha \left(\frac{T_0}{T_a} - \frac{T_0}{T_s} \right) \Delta t}$$

Insert sensors into cylinder specimens, and record the maturity index at 1, 3, 7, 14, and 28 days. Evaluate using either equation. Can be used for either compressive or flexural strength.

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MIT Scanners

Section 414 – PCCP

- Magnetic Induction Tomography (or MPI: Magnetic Pulse Induction)
- Dowel bar placement and pavement thickness –Level of Control I PCCP

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MIT Scanners

We want to ensure dowel bars are in good position, not just that they are in the joint.

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MIT Scanners

Dowels & Dowel Alignment 101

Scan from typical joint showing bars in good position.

Scan from joint indicating an anchoring issue.

Color gradient shows bar orientation.

Scan from joint with missing dowel bars

Scan from joint where the basket opened & dowels tilted

When used with Dowel Bar Inserter, readouts are easy to see.

Using baskets requires some correction factors.

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Smoothness

Section 414 – PCCP

Table 414.4.12.2-1
Must Grind and IRI Acceptance Levels

Speed Limit (mph)	Test Equipment	Bumps/Dips	Full Segment Grind IRI ⁽¹⁾	Corrective Action Required ⁽²⁾⁽⁶⁾	Acceptance IRI ⁽³⁾	Bonus IRI ⁽⁴⁾
S ≥ 45 & Interstate Ramps	HSPD ⁽⁵⁾	> 0.3 inch in 25 ft [7.5 mm in 8m]	95	80 < IRI < 95	60-80	< 60
25 ≤ S < 45		> 0.4 inch in 25 ft [10 mm in 8m]	115	100 < IRI < 115	75-100	< 75
S < 25	Straightedge	> 3/16 inch in 10 ft [5 mm in 3m] ⁽⁶⁾	-	-	-	-

- Changed from measuring PI to measuring IRI
- Working on Pay Adjustment for Smoothness with Sarah Rickgauer
 - Adjustments will be slightly higher than for Plant Mix

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Qualified Products List

We love it! You'll love it too!

Allows us to accept products without Materials Certifications!

- Encouraging all programs to use it
 - https://www.dot.state.wy.us/home/engineering_technical_programs/materials--testing.html
 - dot-qpl@wyo.gov for all inquiries
 - Products MUST be submitted by manufacturers
- Hydration Stabilizers, Water Reducers, Accelerators, Shrinkage Reducing Admix, Air Entrainers, Slump Retention/Rheology, Curing Compounds, Joint Material, Repair Compounds
- We can add new categories as needed
- Approval lasts for 2 years

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