

40-1.01D(1) General

If the pavement quantity is at least 2,000 cu yd, provide a QC manager.

Core pavement as described for thickness, bar placement, and air content.

Provide material, labor, and equipment that meets the initial curing requirement to assist the Engineer in fabricating, curing and handling specimens for the Department's modulus of rupture and compressive strength testing. Failure to maintain the proper curing environment during initial cure will not be basis for rejection of samples, dispute resolution, or claim against the Department. Secure the initial curing equipment at all times to protect against theft and damage.

~~Allow at least 25 days for the Department to schedule testing for the coefficient of friction. Notify the Engineer when a lane or lanes are scheduled to be opened to traffic and when the pavement is ready for testing, which is the latter of:~~

- ~~1. 7 days after paving~~
- ~~2. When the pavement has attained a modulus of rupture of at least 550 psi~~

~~The Department tests for the coefficient of friction within 7 days of receiving notification that the pavement is ready for testing.~~

40-1.01D(6) Test Strips

Construct a test strip for each type of pavement if the quantity is at least 2,000 cu yd. Obtain authorization of test strips before additional paving. Test strips must be:

1. From 700 to 1,000 feet long
2. Same width as the planned paving
3. Constructed using the same equipment to be used for constructing pavement

The Engineer selects from 6 to 12 core locations for dowel bars and up to 6 locations for tie bars for each test strip. If you use mechanical dowel bar inserters, the test strip must demonstrate they do not leave voids, segregations, or surface irregularities such as depressions, dips, or high areas.

Test strips must comply with the acceptance criteria for:

1. Smoothness except an inertial profile is not required
2. Dowel bar and tie bar placement
3. Pavement thickness
4. Final finishing ~~except for the coefficient of friction~~

Allow 3 business days for evaluation of a test strip. If a test strip is not authorized, submit a plan for changes to your materials, methods, or equipment. Allow 3 business days for authorization of the plan. Construct another test strip under the authorized plan.

Remove test strips that are not authorized.

If a test strip is compliant except for smoothness and final finishing, you may grind the surface. After grinding, retest the smoothness under section 36-3. The Engineer retests the thickness after grinding.

Construct additional test strips if you change any of the following:

1. Paving equipment, including:
 - 1.1. Paver
 - 1.2. Dowel bar inserter
 - 1.3. Tie bar inserter
 - 1.4. Tining machine
 - 1.5. Curing equipment
2. Concrete mix proportions

40-1.01D(7) Quality Control**40-1.01D(8)(a) General**

The Department tests the concrete pavement under the test methods and at the frequencies shown in the following table:

Department Acceptance Testing Frequency

Quality characteristic	Test method		Minimum testing frequency ^a
	CRCP	JPCP	
Air content ^b	California Test 504		1 day's paving
Compressive strength at 42 days	California Test 521		1,000 cu yd
Dowel bar placement	--	Measurement	700 sq yd
Tie bar placement	--	Measurement	4,000 sq yd
Coefficient of friction	California Test 342		1 day's paving
Thickness	California Test 531		1,200 sq yd

^aA single test represents no more than the frequency specified.

^bTested only if air entrainment is specified.

40-1.01D(8)(c) Acceptance Testing**40-1.01D(8)(c)(i) General**

The Department accepts concrete pavement based on compliance with the requirements shown in the following table:

Concrete Pavement Requirements for Acceptance

Quality characteristic	Test method		Requirement
	CRCP	JPCP	
Air content	California Test 504		±1.5 % of the specified value ^a
Compressive strength at 42 days (min, psi)	California Test 521		650 ^b equivalent modulus of rupture to compressive strength
Bar reinforcement depth tolerance at joints (min)	Field measurement		1/2 inch below the saw cut depth
Dowel bar placement tolerances ^c : Horizontal offset (inch) Longitudinal translation (inch) Horizontal skew (max, inch) Vertical skew (max, inch) Vertical depth	--	Field measurement	<p style="text-align: center;">±1 ±2 5/8 5/8</p> <p>The minimum distance measured from the concrete pavement surface to any point along the top of the dowel bar must be:</p> <p style="text-align: center;"><i>DB</i> + 1/2 inch where: <i>DB</i> = 1/3 of the pavement thickness or the saw cut depth in inches, whichever is greater</p> <p>The maximum distance below the depth shown must be 5/8 inch</p>
Tie bar placement tolerances ^c : Horizontal and vertical skew (max, inches) Longitudinal translation (inches) Horizontal offset (embedment, inches) Vertical depth	--	Field measurement	<p style="text-align: center;">5-1/4 ±2 ±2</p> <p>1. At least 1/2 inch below the bottom of the saw cut 2. At least 2 inches from any point along the bar to the pavement surface or bottom</p>
Coefficient of friction (min): Concrete pavement Ramp termini	California Test 342		0.30 0.35
Pavement smoothness	California Test 387, AASHTO R 56, and AASHTO R 57		<p>1. No area of localized roughness greater than 160 in/mi, except when grinding existing pavement</p> <p>2. For Mean Roughness Index (MRI) acceptance, refer to the Concrete Pavement Smoothness Selection Table in section 40-1.01D(8)(c)(iii)</p>
Thickness tolerance ^d (max, foot)	California Test 531		0.01 foot deficient of the thickness shown

^aIf no value is specified, the air content must be within ±1.5 % of the value used for your authorized mix design.

^bAverage of the individual test results of 3 cylinders.

^cPlacement tolerance is measured relative to the completed joint.

^dSee section 40-1.01D(8)(c)(iv) for additional thickness requirements.

40-1.03H(3) Final Finishing

After completing preliminary finishing, round the edges of the initial paving widths to a 0.04-foot radius. Round the transverse and longitudinal construction joints to a 0.02-foot radius.

Texture the pavement before curing it. Perform the initial texturing with a burlap drag or broom device that produces striations parallel to the centerline. Perform the final texturing with a spring-steel tined device that produces grooves parallel with the centerline.

Construct longitudinal grooves with a self-propelled machine designed specifically for grooving and texturing pavement. The machine must have tracks to maintain constant speed, provide traction, and maintain accurate tracking along the pavement surface. The machine must have a single row of rectangular spring steel tines. The tines must be from 3/32 to 1/8 inch wide, spaced on 3/4-inch centers, and have enough length, thickness, and resilience to form grooves approximately 3/16 inch deep. The machine must have horizontal and vertical controls. The machine must apply a constant downward pressure on the surface of the pavement during texturing. The operation must not cause raveling.

Construct grooves over the entire pavement width in a single pass except do not construct grooves 3 inches from the pavement edges and longitudinal joints. The final texture must be uniform and smooth. Use a guide to properly align the grooves. The grooves must be parallel and aligned to the pavement edge across its width. The grooves must be from 1/8 to 3/16 inch deep after the pavement has hardened.

For irregular areas and areas inaccessible to the grooving machine, you may construct grooves using the hand method. Hand-constructed grooves must comply with the specifications for machine-constructed grooves.

~~Initial and final texturing must produce a coefficient of friction of at least 0.30. Do not open a lane or lanes to traffic unless the coefficient of friction is at least 0.30.~~

For ramp termini, use heavy brooming normal to the ramp centerline ~~to produce a coefficient of friction of at least 0.35.~~

40-1.03J Protecting Concrete Pavement

Maintain the concrete pavement surface temperature at not less than 40 degrees F for the initial 72 hours.

Protect the surface from activities that cause damage and reduce the texture ~~or coefficient of friction.~~ Prevent soil, gravel, petroleum products, concrete, or asphalt mixes from being deposited on the pavement surface.

Construct crossings for traffic convenience. You may use RSC for crossings if authorized. Do not open crossings until the Department determines that the pavement modulus of rupture is at least 550 psi under California Test 523 or California Test 524.

Do not allow traffic or use equipment on concrete pavement before the concrete has attained a modulus of rupture of 550 psi, or equivalent compressive strength if using maturity per section 40-1.03L, based on your testing unless:

1. Equipment is for sawing contraction joints
2. One side of the paving equipment tracks may be on the concrete pavement after a modulus of rupture of 350 psi has been attained if:
 - 2.1. Unit pressure exerted on the pavement by the paver does not exceed 20 psi
 - 2.2. You change the paving equipment tracks to prevent damage, or the paving equipment tracks travel on protective material, such as planks
 - 2.3. No part of the track is closer than 1 foot to the concrete pavement edge
 - 2.4. Authorized
 - 2.5. You must monitor for damage and immediately discontinue access and suspend operations if any damage becomes apparent

If visible cracking or other damage occurs to the concrete pavement, stop operating the paving equipment on the pavement and repair the damage.

40-1.03O Smoothness and ~~Friction~~ Texture Correction

Correct pavement that is noncompliant for:

1. Smoothness by grinding under section 42-3
2. ~~Coefficient of friction~~ Texture by grooving or grinding under section 42

Do not start corrective work until:

1. Pavement has at least a 550 psi modulus of rupture or equivalent compressive strength if using maturity under section 40-1.03L
2. Corrective method is authorized

Correct the entire lane width. Start and end grinding at lines perpendicular to the roadway centerline. The corrected area must have a uniform texture and appearance.

If corrections are made within areas where testing with an inertial profiler is required, retest the entire lane length with an inertial profiler.

If corrections are made within areas where testing with a 12-foot straightedge is required, retest the corrected area with a straightedge.

~~Allow 25 days for the Department's coefficient of friction retesting.~~