



### Procedure for Box Test

This test method measures the response of a pavement mixture to vibration and the ability of the concrete to hold an edge, thus determining the workability of slip formed paving applications.

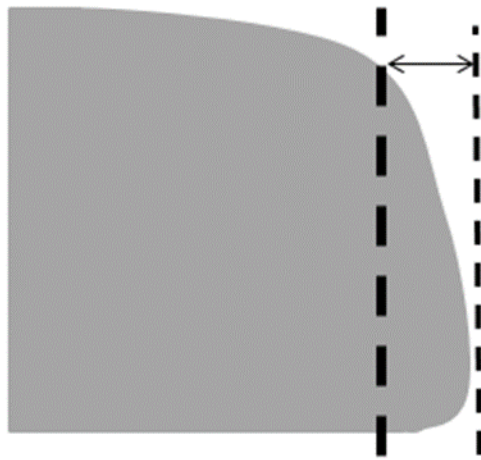
- Sample concrete according to AASHTO R 60- Sampling Freshly Mixed Concrete.
- Dampen the forms with form oil and assemble the Box Test components (forms, platform and clamps) on a flat and level surface.
- Hand scoop the fresh unconsolidated concrete in the constructed box forms to a depth of 9.5 in (241 mm).
- Keeping the head of the vibrator perpendicular to the platform, insert the vibrator head with 12,500 vpm at the center of the sample and vertically lower it in a continuous downward direction for three seconds. Do not touch the platform.
- Then, Move the vibrator in a vertically upward direction to the top of the concrete sample for three seconds.
- Loosen and detach the form clamps. Then remove the Box Test forms in an ascending vertical direction. Care must be taken to ensure the concrete will not stick to the forms.
- Visually rank each side of four sides based on the amount of voids.
- Measure the edge slump of all four sides using a straight edge and a tape measure.

# Performance Engineered Mixtures (PEM)

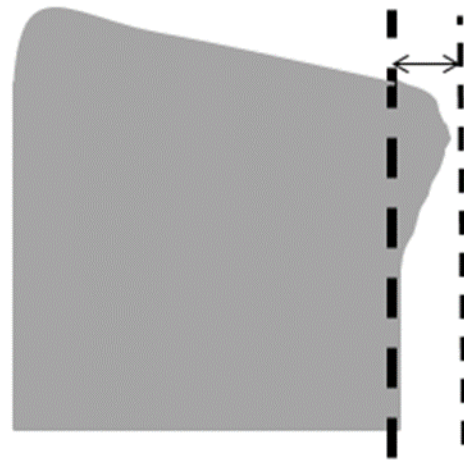


<p><b>Step 1</b> Assemble the components. Hand scoop mixture into box until the concrete level is 9 in. (240 mm).</p>	<p><b>Step 2</b> From the top surface of the concrete, vibrate straight downward for 3 seconds.</p>
<p><b>Step 3</b> Now, vibrate straight upward for 3 seconds. Then remove vibrator.</p>	<p><b>Step 4</b> After removing the clamps and forms, inspect the sides for surface voids and edge slumping.</p>

<p><b>4</b> Over 50% overall surface voids.</p>	<p><b>3</b> 30-50% overall surface voids.</p>
<p><b>2</b> 10-30% overall surface voids.</p>	<p><b>1</b> Less than 10% overall surface voids.</p>



(a) Bottom Edge Slumping



(b) Top Edge Slumping

### Calculation

Estimating voids– After ranking the each side of four sides, calculate the average and standard deviation of these numbers. A ranking of two or less than 30% void count has been deemed sufficient consolidation for slip form paving applications where the specified consolidation energy is used.

Edge slump– After measuring all four sides with a straight edge. An edge slump of 0.25” (6 mm) or less has been deemed sufficient edge slumping to not require edge forms for slip form paving applications.