

## Memorandum

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To: DEPUTY DISTRICT DIRECTORS, Construction  
DEPUTY DIVISION CHIEF, Structure Construction  
CONSTRUCTION MANAGERS  
SENIOR CONSTRUCTION ENGINEERS  
RESIDENT ENGINEERS

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File: Division of Construction  
CPD 20-18



From: Rachel Faisetti, Chief  
Division of Construction

Subject: **HAMBURG WHEEL TRACK TEST FOR HOT MIX ASPHALT**

This directive provides guidance to resident engineers to implement the new California Test 389, "Method of Test for Hamburg Wheel-Track Testing of Compacted Hot Mix Asphalt," and the Hamburg Wheel Track (HWT) test specification quality characteristic requirements for hot mix asphalt (HMA). This directive requires resident engineers, when requested by the contractor, to issue a no-cost change order.

Caltrans and industry representatives identified concerns with test variability, and the specified number of passes to maximum rut depth for rubberized hot mix asphalt-gap graded (RHMA-G) mixes. The Pavement and Materials Partnering Committee formed a working group, comprised of industry representatives and Caltrans. The working group was tasked with evaluating AASHTO T 324, "Standard Method of Test for Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures (Modified)," test protocol and the specifications for HWT quality characteristics for HMA. Caltrans developed a modified test procedure and specifications for acceptance criteria of RHMA-G and issued CPD 19-8, "Hamburg Wheel Track Test for Rubberized Hot Mix Asphalt – Gap Graded," to provide interim guidance. This directive supersedes CPD 19-8 and provides guidance for both HMA Type A and RHMA-G.

The working group evaluated current practices and test procedures for AASHTO T 324, 2017 edition, and came up with 12 modifications. These modifications were implemented through new California Test 389, specification changes necessary to implement California Test 389, and changes to the specified number of passes to maximum rut depth for RHMA-G. These changes were included in the Revised *Standard Specifications* published April 17, 2020.

For HMA, contractors may request a change order to implement California Test 389 and the HWT quality characteristic requirements:

California Test 389 Modifications to AASHTO T 324, 2017 edition

1. One test will consist of four test specimens with two specimens per wheel track. The maximum rut depth for each wheel track is averaged to obtain a single test result. Prepare each plant-produced sample in accordance with AASHTO R 30.
2. Compact specimens in accordance with AASHTO T 312 to a thickness of 60 millimeters  $\pm$  1 millimeter.
3. Sampling must be performed in accordance with California Test 125 in place of AASHTO T 168.
4. Cut specimens to achieve a target gap of 4 millimeter  $\pm$  3 millimeter between the molds.
5. The target air void content for RHMA-G will be 6.5%  $\pm$  0.5% for laboratory compacted specimens.
6. Sample sets should be comprised of two specimens. The average air voids for the specimens in each set shall be approximately equal to each other.
7. Insert the cut specimens in the molds with the gyratory ram side facing down.
8. Testing temperature for RHMA-G specified binder grade Performance Grade 64 and lower shall be 122°F  $\pm$  2°F and 131°F  $\pm$  2°F for specified binder grade Performance Grade 70. For HMA Type A, specified binder grade Performance Grade 58 shall be 113°F  $\pm$  2°F, specified binder grade Performance Grade 64 shall be 122°F  $\pm$  2°F and for specified binder grade Performance Grade 70 or high shall be 131°F  $\pm$  2°F.
9. Maximum machine shut-off rut depth for the test shall be set at 20 millimeter.
10. Set the maximum number of passes to the specified number of passes in the contract specifications.
11. The end of the test will be when the specified number of passes are achieved or when the maximum rut depth of 20 millimeter is achieved in either sample set.
12. One test is defined as four specimens (two sample sets) ran in the HWT device simultaneously. If the two sample sets differ by 6 millimeter or greater, retest the material. Perform only one retest and report the results with the least variation. Rut depth results shall be reported as the average between the deepest rut of the left and right wheel.

Specification Changes

1. Replace AASHTO T 324 with California Test 389.
2. Remove the definition of AASHTO T 324 (Modified). This reduces the currently specified allowance of 4 hours maximum submersion time to the national standard of 60 minutes.

3. Remove AASHTO T 324 (Modified) and reference California Test 389 for mix conditioning.
4. The stripping inflection point shall be reported only for Type A HMA and RHMA-G.
5. For RHMA-G, the specified number of passes to maximum rut depth shall be 15,000 passes for Performance Grade 64 and lower and 20,000 passes for Performance Grade 70.

There should be no contract time extension for implementing the contractor requested change order. Attached to this directive are a sample change order memorandum and sample change order to implement California Test 389 and the HWT quality characteristic requirements. This directive serves as delegation of authority from the Division of Construction for change order approval, except when change order language is altered. Projects of Division Interest are subject to FHWA oversight requirements; consult the FHWA transportation engineer for change order concurrence.

If you have questions or comments regarding this directive, contact Raghu Thangavelautham, Division of Construction, at [Raguparan.Thangavelautham@dot.ca.gov](mailto:Raguparan.Thangavelautham@dot.ca.gov) or (916) 227-5705.

Attachments:

1. Sample Form CEM-4903, "Change Order Memorandum"
2. Sample Form CEM-4900, "Change Order"