 <p><b>Manitoba</b> Transportation and Infrastructure</p> <p>Highway Design</p>	Standard No.: <b>MEB-P054</b>
	<p><u>Effective Date</u> Current: <b>March 2023</b> Previous: <b>None</b></p>
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Standard Test Method: <b>Preparation of Bituminous Aggregates for the Determination of Physical Properties</b>	

## 1.0 SCOPE

This test method covers the blending of as-received bituminous aggregate samples according to mix design for testing of physical properties.

## 2.0 REFERENCE STANDARDS

### *ASTM Standards*

- D6307 Asphalt Content of Asphalt Mixture by Ignition Method
- C702 Reducing Samples of Aggregate to Testing Size

### *MTO Standards*

- LS-600 Dry Preparation of Aggregates for the Determination of Physical Constants

## 3.0 DEFINITION

Blended aggregates: As-received aggregate samples combined as per the bituminous mix design


Recycled Asphalt Pavement (RAP): Bituminous Pavement that has been removed and processed for the purpose of recycling

## 4.0 PROCEDURE

- 4.1 Prepare as-received aggregate samples by drying in oven at  $110 \pm 5^\circ\text{C}$ . For RAP samples, dry in oven at  $40^\circ\text{C}$  or air-dry.
  - 4.1.1 For RAP, remove asphalt cement using ignition oven as per *ASTM D6307 Asphalt Content of Asphalt Mixture by Ignition Method*.
- 4.2 Split off sufficient quantities of each aggregate component based on individual percentages stated in the mix design and quantity of material required for the test.
  - 4.2.1 For RAP, the proportion of aggregate contributing to the blend is based on the mass of aggregate in the sample after removal of asphalt cement.
- 4.3 Place the portions of aggregate components in a vessel of appropriate size and blend by mixing.
- 4.4 When required, split the portion based on test requirements.

## 5.0 CALCULATION

### 5.1 Blending calculation when bituminous mix is composed of virgin aggregate only

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5.1.1 Mass of the total blended sample required for testing:

$$M_t = M_1 + M_2 + M_3 + \dots M_n$$

Where,

$M_t$  = Mass of total blended sample required for testing, g

$M_n$  = Mass of aggregate components in the blended sample, g

5.1.2 Mass of the aggregate component:

$$M_n = M_t * P_1$$

Where,

$P_n$  = Proportion of the aggregate components given in the mix design, %

## 5.2 Blending calculation when RAP is a component of the mix design and is included in the blended test sample

5.2.1 Mass of the total blended sample required for testing:

$$M_t = M_1 + M_2 + M_3 + \dots M_n + M_{Rn}$$

Where,

$M_{Rn}$  = Mass of RAP component in the blended sample, g

5.2.2 Mass of the aggregate component:

$$M_n = M_t * P_{n \text{ adj}}$$

Where,

$P_{n \text{ adj}}$  = Adjusted proportion of the aggregate components in the blended sample after removal of AC in the RAP, %


5.2.3 Adjusted proportion of the aggregate component

$$P_{n \text{ adj}} = \frac{P_n}{\left(100 - \frac{Pr_1 * A}{100}\right)} * 100$$

Where,

$Pr_1$  = Proportion of RAP component given in the mix design, %

$A$  = Asphalt cement content of RAP, %

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### 5.3 Blending calculation when RAP is a component of the mix design and is not included in the blended test sample

5.3.1 Mass of the total blended sample required for testing:

$$M_t = M_1 + M_2 + M_3 + \dots M_n$$

Where,

$M_t$  = Mass of total blended sample required for testing, g

$M_n$  = Mass of aggregate components in the blended sample, g

5.3.2 Mass of the aggregate component:

$$M_n = M_t * P_{n \text{ adj}}$$

Where,

$P_{n \text{ adj}}$  = Adjusted proportion of the aggregate components in the blended sample without including RAP, %

5.3.3 Adjusted proportion of the aggregate component without including RAP

$$P_{n \text{ adj}} = \frac{P_n}{(P_1 + P_2 + \dots + P_n)} * 100$$

Where,

$P_n$  = Proportion of the aggregate components given in the mix design, %.

Note: Do not include RAP proportion in this calculation.