TEX-116-E

Ball Mill Method for Determining the Disintegration of Flexible Base Material

Why

To measure a material's ability to withstand degradation in the road base and detect soft aggregate vulnerable to weathering.

When

- Spec. 247
- Spec. 292

How

Equipment

- Scale, Minimum capacity of 33 lb.
- Container, 2L (0.5 gal.)
- Metal Spheres
- Oven, maintaining 230 ± 9°F
- Standard U.S. Sieves
- Wet Ball Mill machine

Procedure

Part I: Wet Ball Mill Percent

- Prepare and determine the gradation per Tex-101-E, Part II.
- Weigh a 3500 ± 50 g (7.7 ± 1.1 lb.) sample using the bulk gradation from Tex-101-E, Part II into a pan and record to the nearest 1 g or 0.1 lb.
- Pour 2L (0.5 gal.) water into the pan with the sample.
  - Allow the sample to soak for 1 hr. ± 5 min.
- Alternatively
  - Place six steel spheres, the dry sample, and pour 2L (0.5 gal.) water into the cylinder to cover the sample completely.
  - Allow the sample to soak for 1 hr. ± 5 min.
- When the sample is soaked in the pan decant the water into a 2L container
- Place the six steel spheres in the wet ball mill cylinder.
- Then transfer the sample into the cylinder.
- Use the water decanted to wash material from the pan into the cylinder.
- Secure the lid and run the machine for 600 revolutions.
- After the machine is done collect the sample from the cylinder in a clean pan.
- Wash the sample over a No. 40 sieve.
- Dry the aggregate retained on the No. 40 sieve to constant weight at 230 ± 9°F.
- Re-sieve the dried material over a No. 40 sieve.
- Weigh the material retained on the No. 40 sieve and record it to the nearest 1 g or 0.1 lb.

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Part II: Wet Ball Mill Precent Increase Passing the No. 40 Sieve

- Weigh a 3000 ± 50 g (6.6 ± 1.1 lb.) sample using the bulk gradation from Tex-101-E, Part II into a pan and record to the nearest 1 g or 0.1 lb.
- Wash the sample over a No. 40 sieve.
- Dry the aggregate retained on the No. 40 sieve to constant weight at 230 ± 9°F.
- Re-sieve the dried material over a No. 40 sieve.
- Weigh the material retained on the No. 40 sieve and record it to the nearest 1 g or 0.1 lb.

Action

Calculation

- Calculate the Wet Ball Mill percent from Part I.

$$WetBallMill\% = 100 \times (\frac{W_{Initial} - W_{No.40}}{W_{Initial}})$$

$W_{Initial}$ = Weight of total sample.

$W_{No. 40}$ = Weight of material Retained on No. 40 sieve

- Calculate the percent of material passing the No. 40 sieve from Part II.

$$\%PassingNo.40 = 100 \times (\frac{W_{Initial} - W_{No.40}}{W_{Initial}})$$

$W_{Initial}$ = Weight of total sample.

$W_{No. 40}$ = Weight of material Retained on No. 40 sieve

$$PrecentIncreaseNo.40sieve = WetBall\% - \%PassingNo.40$$

Wet Ball Mill %, calculated above.
% Passing No. 40, calculated above

- Report
  - Wet Ball Mill precent to the nearest whole number
  - Wet Ball Mill increase passing the No. 40 sieve to the nearest whole number