

**KTMR-15 DETERMINING IF FLY ASH IS PRESENT IN PLASTIC PORTLAND CEMENT CONCRETE OR PORTLAND CEMENT (Kansas Central Lab Test KT-MR15)**

**a. SCOPE**

This method of test details a procedure for determining that Portland Cement, or Portland Cement concrete contains fly ash.

**b. APPARATUS**

- b.1.** Microscope capable of a magnification factor of approximately 100x.
- b.2.** Stackable sieves consisting of a 45 µm (No. 325) mesh nested below a 75 µm (No. 200) mesh.
- b.3.** Heat lamp or hot plate.
- b.4.** Glass slides (box of 20)
- b.5.** Plastic wash bottle.
- b.6.** Tablespoon or spatula
- b.7.** Small bottle or jar with lid (59 ml [2 oz] - 4 each)
- b.8.** Spare batteries (2 AA size)
- b.9.** Water resistant marking pen for marking slides

**c. PROCEDURE**

**c.1. Sample**

The sample may consist of Portland Cement or the mortar fraction of plastic concrete.

**c.2. Sample Preparation**

**c.2.a.** Plastic concrete if test facilities are not immediately available.

**c.2.a.1.** Take 45 to 60 mm<sup>3</sup> (3 to 4 tablespoons) of matrix from the plastic concrete and place in a small bottle or jar.

**c.2.a.2.** Fill the remainder of the jar with water.

**c.2.a.3.** Shake vigorously for about one minute.

**c.2.a.4.** Deliver the sample for testing, preferably within 24 hours.

**c.2.b.** When test facilities are available:

**c.2.b.1.** Shake the solution sample vigorously for about one minute.

**c.2.b.2.** Place about 45 mm<sup>3</sup> (1 tablespoon) of the solution or dry cement powder, whichever is appropriate, in the 75 μm (No. 200) sieve with the 45 μm (No. 325) sieve nested below.

**c.2.b.3.** Wash the sample through the 75 μm (No. 200) sieve using a plastic wash bottle or a narrow stream of tap water.

**c.2.b.4.** After washing the sample with approximately 250-ml (1 cup) of water, remove the 75 μm (No. 200) sieve and clean it thoroughly. (Note 1)

**c.2.b.5.** Allow the 45 μm (No. 325) sieve to drain with the retained portion of the sample in it. Tapping lightly on the sieve will increase the rate of drainage. When the sieve has drained, wash the residue using a plastic wash bottle or a narrow stream of tap water until the water passing through the sieve is clear.

**c.2.b.6.** If very little residue is visible on the 45 μm (No. 325) sieve, repeat steps 1 through 4.

**c.2.b.7.** Using a heat lamp or hot plate, thoroughly dry the 45 μm (No. 325) sieve and its residue.

**c.2.b.8.** When the sample on the 45 μm (No. 325) sieve has dried completely, carefully tap a small portion of the test sample from the sieve onto the glass slide. Thoroughly clean the 45 μm (No. 325) sieve. (Note 1)

Note 1: Even with proper cleaning, the sieves will eventually become blocked with hardened Portland Cement. When this happens, soaking in distilled white vinegar overnight may clean the sieves. After soaking, thoroughly rinse the sieve. The cleaning solution may be saved and reused.

**c.2.c.** Sample Examination

**c.2.c.1.** Place the slide in the microscope. Adjust the light source to reflect off of the sample and focus the microscope.

**c.2.c.2.** Examine the sample to determine whether any glassy, spherical particles are present. The presence of any glassy spheres indicates the presence of fly ash in the sample. Figures 1, 2, and 3 show typical examples. (A black or dark colored background may aid in viewing the sample.)