## KTMR-28 DETERMINATION OF TOTAL ACID INSOLUBLE RESIDUE (Kansas Central Lab Test KT-MR-28)

### a. SCOPE

This method of test determines the total acid insoluble residue of crushed limestone or dolomite.

### b. REFERENCED DOCUMENTS

**b.1.** AASHTO M 231: Weighing devices used in the Testing of Materials

**b.2.** AASHTO T 248: Reducing Samples of Aggregate to Testing Size

### c. APPARATUS PART 1

**c.1.** Glass or plastic wide-mouth 3.8 L (1 gal.) jar

**c.2.** Concentrated hydrochloric acid

**c.3.** Stirring rod

**c.4.** Small sample splitter as specified in AASHTO T248

**c.5.** Weighing device meeting AASHTO M 231 Class G2

### d. SAMPLE PREPARATION

**d.1.** Split the sample to obtain a 200 g sample.

**d.2.** Crush the 200 g sample so that at least 75% passes the 4.75 mm (No. 4) sieve.

**d.3.** Dry the sample in the oven maintained at $110 \pm 5^{o}C$ ($230 \pm 9^{o}F$) for 24 hours.

**d.4.** Permit the sample to cool until it can be touched with a bare hand. Weigh the sample to 0.1 g, and record as sample mass "B".

### e. PROCEDURE

**e.1.** Place the sample in the wide-mouth jar and add distilled water to cover the sample.

**e.2.** With the jar under an exhaust hood, add approximately 25 mL of concentrated hydrochloric acid. Stir until the reaction stops. If the reaction is violent, direct a stream of distilled water around the inside of the jar to subdue the reaction, keeping all reactants inside the jar.

**e.2.a.** Continue adding hydrochloric acid in increments of 25 mL until the reaction stops; reaction is stopped when there are no visible bubbles. Clean stirring rod into container with distilled water.

**e.3.** Add an additional 20 mL of hydrochloric acid and allow to stand overnight to ensure removal of all carbonates.

## f. APPARATUS PART 2

**f.1.** Buchner Funnel

**f.2.** Whatman No. 42 filter paper

**f.3.** Vacuum filtering flask

**f.4.** Rubber stopper

**f.5.** Oven capable of maintaining $110 \pm 5^{o}C$ ($230 \pm 9^{o}F$)

## g. SAMPLE PREPARATION

**g.1** Assemble the vacuum filtering apparatus--Buchner funnel, filtering flask, and vacuum line.

**g.2.** Determine mass of Whatman No. 42 filter paper.

**g.3.** Place the Whatman No. 42 filter paper in the Buchner funnel and open the vacuum line slightly. Pour distilled water over the filter paper and smooth the filter paper with a clean stirring rod to seal it to the bottom of the funnel. Check for leaks around the edge of the filter paper.

## h. PROCEDURE

**h.1.** Transfer all the sample residue and solution to the Buchner funnel for filtration.

**h.2.** Wash the residue with distilled water to remove all free chloride.

**h.3.** Remove residue from the Buchner funnel, including filter paper, and place in an evaporating dish and dry for 24 hours at $110 \pm 5^{o}C$ ($230 \pm 9^{o}F$).

**h.4.** Permit the evaporating dish to cool until it can be touched with a bare hand. Weigh the residue and filter to 0.1 g, and record as sample mass "A".

## i. CALCULATION

**i.1.** Compute percent acid insoluble residue as follows:

$$\%AI = (100)\ (A/B)$$

where: A = sample mass "A" = (mass of residue + filter paper) - mass of filter paper

B = sample mass "B" = initial mass of oven dried sample