KTMR-41 COARSE AGGREGATE RESISTIVITY (Kansas Central Lab Test KT-MR-41)

a.   SCOPE

This method of test covers the determination of the resistivity of coarse aggregate materials for use as MSE wall backfill.

b.   REFRENCED DOCUMENTS

b.1.   ASTM D 1193-06:   Standard Specification for Reagent Water

b.2.   ASTM D 75-14:   Standard Practice for Sampling Aggregates

b.3.   KU-15-5:   Testing Aggregate Backfill for Corrosion Potential

c.   APPARATUS

c.1.   Two-electrode soil box

c.2.   Soil resistance meter—commercially available soil resistance meters are commonly used for measuring soil resistivity. They offer convenience, ease of use, and repeatability. Soil resistance meters yield direct readings in ohms, which are multiplied by the appropriate factor for the specific two-electrode soil box. The meter utilized may limit the upper range of resistivity, which can be measured. In such cases the resistivity should be reported as greater than the meter's upper limit. The meter used must be capable of injecting a minimum of 10-mA of test current and reporting resistances up to 2 K-ohms.

c.3.   18 to 22 AWG insulated stranded copper wiring with low resistance terminals and connections.

d.   Reagents and Materials

d.1.   Distilled or deionized water (Type IV grade as referenced in Specification D1193) to saturate samples.

   NOTE a: Other types and conductivities of water may be used as specified below, but must be noted on the report

d.1.1   Water adjusted to a conductivity of 50 micro-semen/cm. This water conductivity approximates the highest value for rainwater.

d.1.2 Water adjusted to a conductivity consistent with the geographical area. Information for such in the United States of America is available through the national Oceanic and Atmospheric Administration.

e.   SAMPLE PREPARATION

e.1. The required sample size is dependent on the dimensions of the two-electrode soil box. Refer to ASTM D 75 for the appropriate sample size based on the maximum particle size of the aggregate.

e.2. The sample should be allowed to reach room temperature (approximately 20° C) prior to testing.

f.   PROCEDURE

f.1. Remove any foreign material such as roots, twigs, and so forth from the sample.

f.2. Fill the soil box by adding increments of aggregate. Compact each wetted increment as densely as possible by using a jigging procedure consisting of alternately living and dropping opposite sides of the soil box a height of 1 inch for 25 cycles, making sure the voids are eliminated.

f.2. Using a straightedge, level off the excess compacted material so that it conforms to the total volume of the soil box.

f.3. Add the water chosen from step **d.1.** until the soil box is full. Cover and allow to soak for 24 +/- 1 hour prior to testing. Add water as needed to maintain 100% saturation.

f.4. Remove the cover and connect the soils resistance meter to the soil box.

f.5. Open the drain on the resistivity box.

f.6. At the time the water level falls below the base of the soil box record the resistivity measurement.

f.7. When requested to supply as-received sample results perform steps **f.1.-f.4** and then record the resistivity measurement.

g.   CALCULATIONS

g.1.   Determine the soil box factor (BF) by using the following formula, BF = Height x Width / Length. For example, a box with Dimensions of 4 cm (H) x 6 cm (W) x 8 cm (L) would have a BF of 3.

g.2.   Multiply the BF by the reading obtained in step **f.6.** or **f.7.** to obtain the aggregate resistivity.

h.   REPORT

h.1.   Report the following information

h.1.1. Resistivity value for the sample(s) in ohm-cm

h.1.2. Temperature of the sample during measurement

h.1.3. Date of sample collection and date of test.

h.1.4. The depth of sample

h.1.5. The moisture condition of the sample

h.1.6. Type and conductivity of water used

h.1.7. Location specifics

h.1.8. Identity of who submitted sample and sample source

i.   CALIBRATION AND STANDARDIZATION

i.1.   The accuracy of the resistance meter shall be periodically checked with a commercial decade box or several appropriate known value resistors. Meter error shall not exceed 5% over the range or the instrument. If error exceeds this limit, prepare a calibration curve and correct all measurements accordingly.

i.2.   The two-electrode soil box can be calibrated using solutions of known resistivity. Commercially available solutions (VWR Conductivity Calibration Standards) in the range of 1000, 5000, and 10,000 ohm-cm are recommended for this purpose. Calibration checks should be performed biannually.