Test Procedure for

DETERMINING CRUSHED FACE PARTICLE COUNT

TxDOT Designation: Tex-460-A

Effective Date: August 1999

1. SCOPE

1.1 Use this method to determine the percent of coarse aggregate particles meeting the crushed face requirement and the percent of non-polishing aggregate.

1.2 The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.

PART I—DETERMINING CRUSHED FACE COUNT

2. SCOPE

2.1 This part describes the steps necessary to determine the crushed face count of aggregate.

3. DEFINITIONS

3.1 *Crushed Face*—a fractured surface produced by the mechanical crushing of an aggregate. Identify crushed aggregate faces by fresh fractures and lack of evidence of weathering.

3.2 *Particle Projected Area*—the maximum cross sectional area of the fractured particle.

4. APPARATUS

4.1 *Drying oven,* maintained at 110 ± 5°C (230 ± 9°F).

4.2 *Standard U.S. sieve,* meeting the requirements of Tex-907-K, 4.75 mm (No. 4).

5. PROCEDURE

5.1 Secure a representative aggregate sample. (In the event that foreign matter hinders determination of crushed face**,** wash the sample.)

5.2 Aggregate samples should have a surface dry condition.

5.3 Quarter the sample in accordance with Tex-400-A so that the material retained on the 4.75 mm (No. 4) sieve contains approximately 400 particles. Take larger test samples to improve test accuracy.

5.4 Sieve the sample over the 4.75 mm (No. 4) sieve and discard the passing material. Spread the retained material on a smooth surface. (A contrasting surface color is preferable.)

5.5 Closely examine the surface of each aggregate particle in the sample. To verify that a particle meets the crushed face criteria, hold the aggregate particle to view the face directly. If the face constitutes at least one quarter of the particle projected area of the rock particle, consider it a crushed face.

5.5.1 Place particles with two or more crushed faces in one pile.

5.5.2 Place particles with fewer than two crushed faces in a second pile.

5.5.3 Place particles that are questionable in a third pile.

5.6 After completely separating the test sample, count the number of particles in each pile.

5.6.1 Record the number of particles in the pile with two or more crushed faces as N_F under Section 6.

5.6.2 Record the number of particles with one or no crushed faces as N_U under Section 6.

5.6.3 Record the number of particles in the questionable pile as N_Q under Section 6.

Note 1—If for any one determination, the number of questionable particles exceeds 15%, repeat the determination until less than 15% is present in that category.

6. CALCULATIONS

6.1 Calculate the Percent Crushed Particles:

$$100\{[N_F + (N_Q / 2)] / [(N_F + N_U + N_Q)]\}$$

Where:

N_F = particles in pile with two or more crushed faces

N_U = particles with fewer than two crushed faces

N_Q = particles in the questionable pile.

7. REPORT

7.1 Report results to the nearest whole percent.

PART II—DETERMINING PERCENT BY VOLUME OF NON-POLISHING AGGREGATE

8. SCOPE

8.1 Part II of this procedure is a method for checking the percent of non-polishing aggregate added to an aggregate blend to improve the polish value. Method B is for use with samples that have a significant specific gravity difference (i.e., synthetic aggregates, fired clay, and slag).

9. PROCEDURES

9.1 *Method A (Numeric):*

9.1.1 Repeat Part I, Sections 5.1–5.4.

Note 2—Substitute the 2.00 mm (No. 10) sieve for the 4.75 mm (No. 4) sieve when the specification requires testing of the 2.00 mm (No. 10) size fraction.

9.1.2 Separate the sample into two piles according to visual differences such as color and shape.

9.1.3 After completely separating the test sample:

9.1.3.1 Count the number of particles in the non-polishing pile and record as N_N under Section 10.

9.1.3.2 Count the number of total particles and record as N_T under Section 10.

9.2 *Method B (Volumetric):*

9.2.1 Repeat Part I, Sections 5.1–5.4.

Note 3—Substitute the 2.00 mm (No. 10) sieve for the 4.75 mm (No. 4) sieve when the specification requires testing of the 2.00 mm (No. 10) size fraction.

9.2.2 Separate the sample into two piles according to visual differences such as color and shape.

9.2.3 After completely separating the test sample:

9.2.3.1 Weigh the particles in the non-polishing pile and record the mass as M_N under Section 10.

9.2.3.2 Weigh the retained material and record the mass as M_R under Section 10.

10. CALCULATIONS

10.1 Calculate percent of non-polishing aggregate:

$$Percent = 100 \bullet N_N \; / \; N_T$$

Where:

N_N = number of particles in the non-polishing pile

N_T = total number of particles.

10.2 Calculate volume of retained material,(V_R), m^3 (ft^3):

$$V_R = M_R \; / \; (G_B \bullet W_W)$$

10.3 Calculate volume of non-polishing aggregate, (V_N), m^3 (ft^3):

$$V_N = M_N \; / \; (G_N \bullet W_W)$$

Where:

G_B = bulk specific gravity of the aggregate blend as tested in Tex-403-A in the proper proportions tested here

G_N = bulk specific gravity of the non-polishing aggregate as tested in Tex-403-A in the proper proportions tested here

M_R = mass of retained material, kg

M_N = mass of non-polishing aggregate, kg

W_W = unit mass of water, 1000 kg/m^3 (62.4 lb./$ft.^3$)

10.4 Calculate percent of non-polishing aggregate:

$$Percent = 100 \bullet V_N \; / \; V_R$$

Where:

V_R = volume of retained material

V_N =volume of non-polishing aggregate.

11. REPORT

11.1 Report results to the nearest whole percent.