Procedure for Reducing Samples to Testing Size

1. Scope:

These procedures are for the reduction of field samples of aggregates to the appropriate size for testing.

2. Apparatus:

2.1 Mechanical Method.

A. Mechanical sample splitter shall be equipped with 3 receptacles large enough to hold the sample following splitting. Only these receptacles shall be used when reducing the sample to the required testing size.

B. Sample splitters shall have an even number of equal width chutes. The number of chutes for coarse aggregate shall not be less than 8, and for fine aggregate, not less than 12. The chutes shall discharge alternately to each side of the splitter. The minimum width of the individual chutes shall be approximately 50% larger than the largest particles in the sample to be split. For fine aggregate a splitter having chutes 1/2” wide will be satisfactory when the entire sample passes the 3/8” sieve.

C. The splitter shall be equipped with a hopper or a straight edge pan, which has a width equal to or slightly less than the overall width of the assembly of chutes.

D. The splitter shall be leveled in a manner to ensure uniform material distribution throughout the chutes.

2.2 Quartering Method.

A. Canvas, heavy polyethylene or other suitable surface, or minimum of 24” x 24” x 4” pan.

B. Straightedge, scoop, shovel, or trowel.

C. Broom or brush.

3. Procedure:

3.1 Fine aggregate that is drier than saturated surface dry shall be reduced in size with a mechanical splitter. Fine aggregate with free moisture on the aggregate may be reduced by quartering before reducing the sample to required size.

Fine aggregate is defined as an aggregate in which the entire sample will pass the 3/8" sieve.

Saturated surface dry condition may be determined, as a quick approximation, if the fine aggregate will retain its shape when molded in the hand, it may be considered to be wetter than saturated-surface dry.

If the moist sample is large, a preliminary split may be made using a mechanical splitter having wide chute openings 1½" or more to reduce the sample to not less than 5000 grams. This portion is then dried and reduction to test sample size is completed.

Coarse aggregates and mixtures of coarse and fine aggregates may be reduced to test sample size using a mechanical splitter, in which the sample will flow smoothly without restriction or loss of material. The quartering method may be used without regard to moisture in the aggregates.

3.2 Mechanical Splitter (Figure 1).

Depending on the type of material, number of samples to be tested and the size of the sample needed for the required testing the appropriate method of splitting must be used.

Prior to splitting, blend and mix the sample a minimum of three times by using the mechanical splitter or mixing the buckets on large samples.

Method 1 Used when only one container is needed to hold all the material for testing and backups. (Figure 2)

A. Adjust splitter bars for required chute width.

B. Place sample in closed hopper, in an evenly distributed manner. 23

C. Split the material by opening the gates of the hopper. The sample shall be fed at a controlled rate into the chutes.

D. Check for approximately equal splits by weighing material in each pan.

Coarse aggregate splits should be within 500 grams and fine aggregate within 30 grams. If splits are not within the tolerance, the material will be re-combined and re-split.

E. Sample A may be tested or if needed, material will be reintroduced into the splitter as many times as necessary to reduce the sample to the size specified for the intended test. Sample B may be saved as a backup or used for Independent Assurance testing.

When Independent Assurance testing is performed in conjunction with Acceptance test, both samples should be large enough to allow backup samples.

Method 2 Used when two containers are needed to hold all the material for testing and backup. (Figure 3)

A. Adjust splitter bars for required chute width.

B. Place sample in closed hopper, in an evenly distributed manner.

C. Combine and blend Original Sample (1) and Original Sample (2). 23

D. To assure representative samples, split Blended Sample (1) and Blended Sample (2) to obtain the four samples (a), (b), (c), (d). These samples can be tested or reduced further as needed.

E. Check for approximately equal splits by weighing material in each pan. Coarse aggregate splits should be within 500 grams and fine aggregate within 30 grams. If splits are not within the tolerance, the material will be re-combined and re-split.

F. If eight samples are required then split samples (a), (b), (c) and (d) to have eight approximately equal samples.

Figure 1

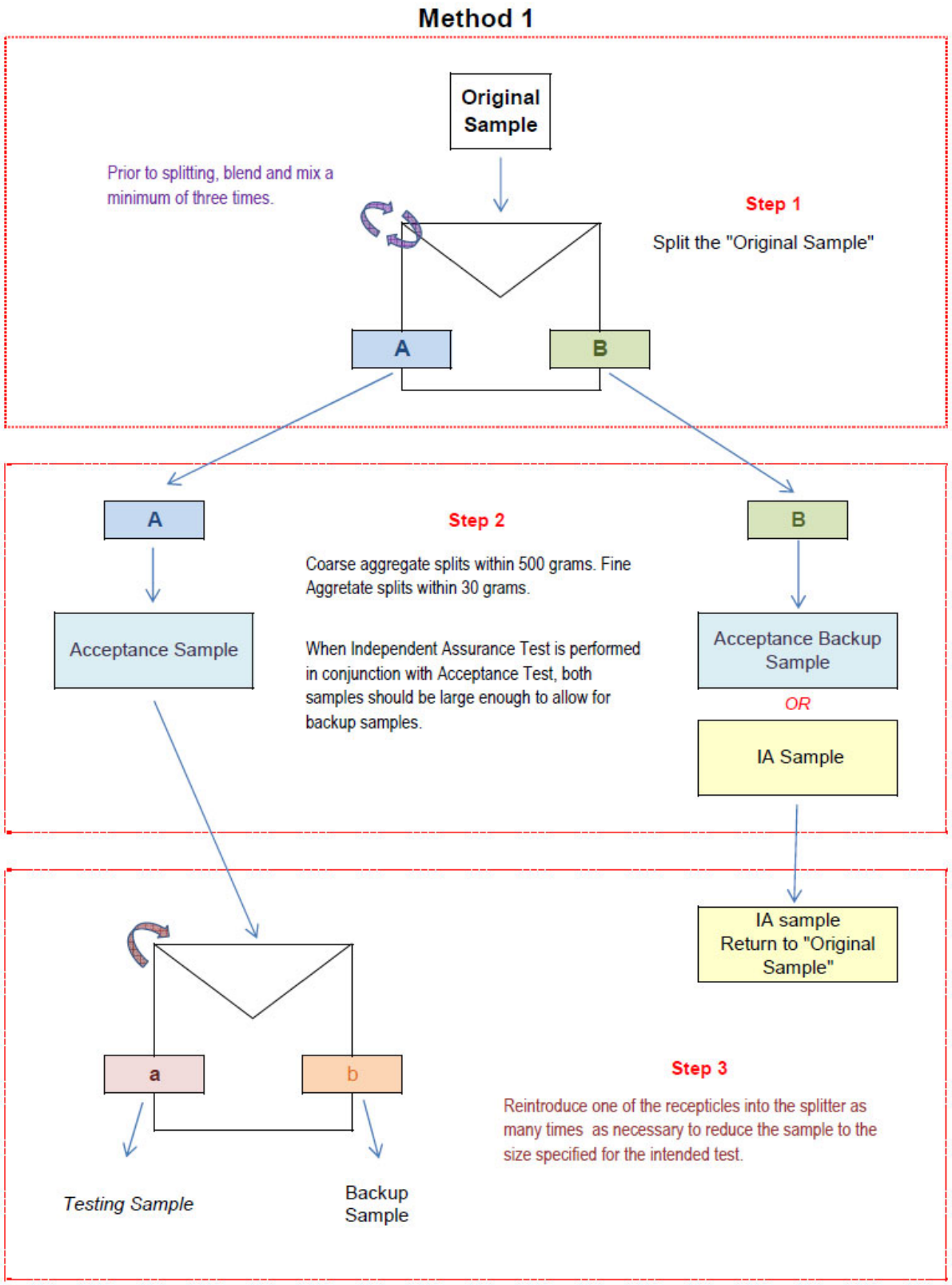

Method 1
Original Sample
Prior to splitting, blend and mix a minimum of three times.
Step 1
Split the "Original Sample"
A
B
A
B
Step 2
Coarse aggregate splits within 500 grams. Fine Aggretate splits within 30 grams.
When Independent Assurance Test is performed in conjunction with Acceptance Test, both samples should be large enough to allow for backup samples.
Acceptance Sample
Acceptance Backup Sample
OR
IA Sample
IA sample Return to "Original Sample"
a
b
Step 3
Reintroduce one of the recepticles into the splitter as many times as necessary to reduce the sample to the size specified for the intended test.
Testing Sample
Backup Sample

Figure 2

23

METHOD 2
Class Q Asphalt

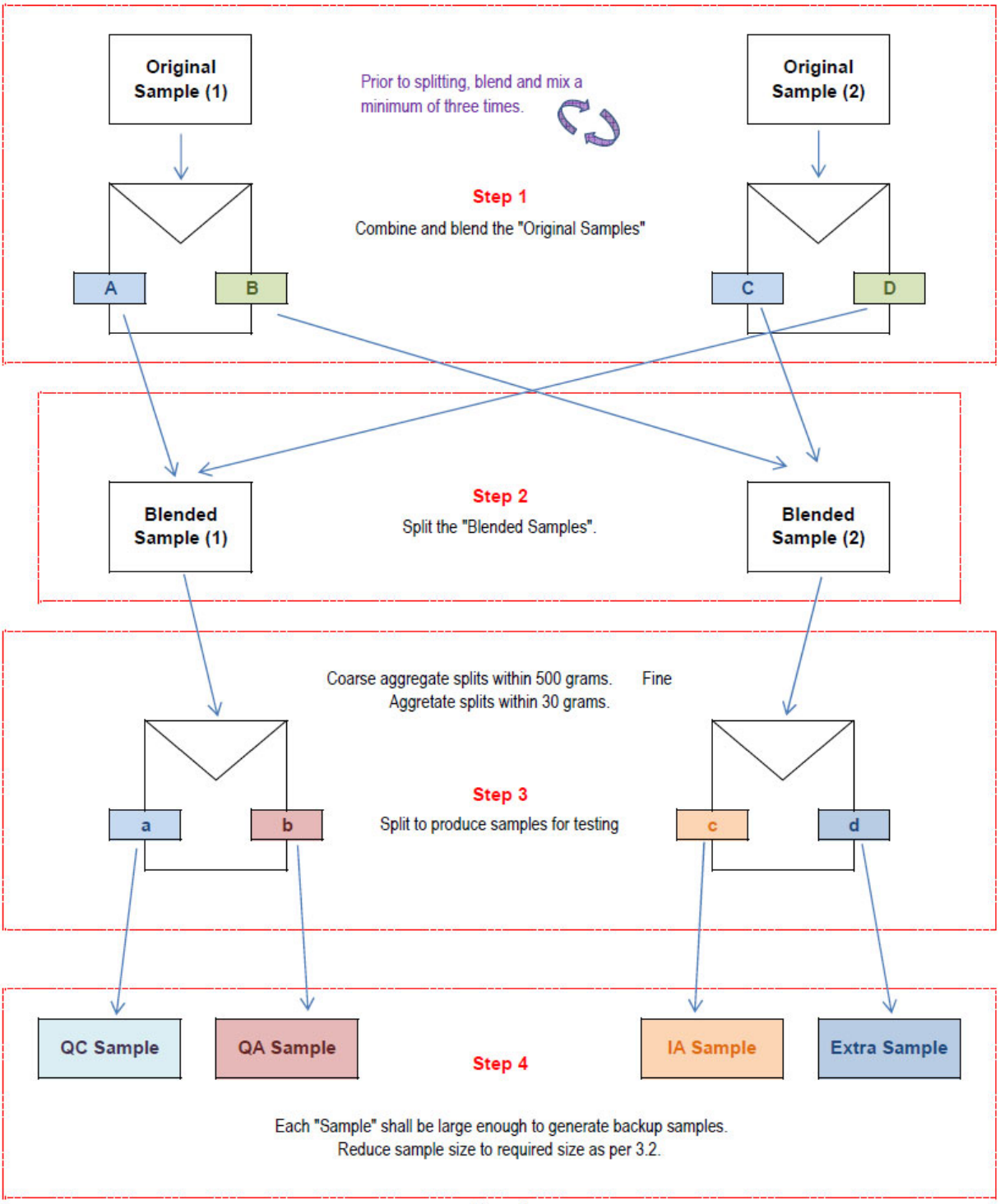


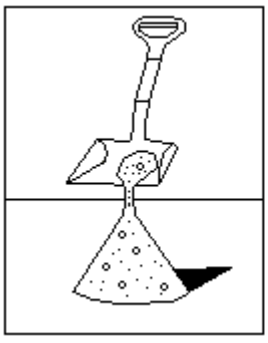
Figure 3

23

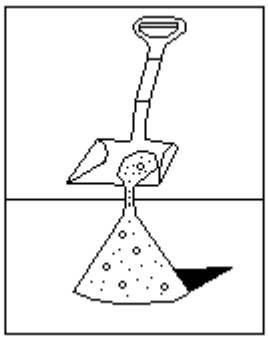
3.3 Quartering.

A. Place the sample on a hard, clean, level surface where there will be neither loss of material nor the addition of foreign material. Thoroughly mix the sample by turning the entire sample over at least three times. With the last turning, shovel the entire sample into a conical pile by depositing each shovelful on top of the preceding one. Carefully flatten the conical pile to a uniform thickness and diameter by pressing down the apex with a shovel so that each quarter sector of the resulting pile will contain the material originally in it. The diameter should be approximately 4 to 8 times the thickness. Divide the flattened mass into 4 equal quarters with a shovel or trowel and remove 2 diagonally opposite quarters, including all fine material, and brush the cleared spaces clean. Successively mix and quarter the remaining material until the sample is reduced to the desired size as shown in figure 4.

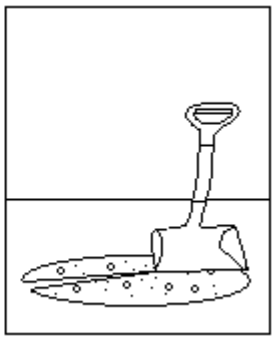
B. As an alternative when the floor surface is uneven, the field sample may be placed on a canvas blanket and mixed with a shovel as described in paragraph 3.3.A. or by alternately lifting each corner of the canvas and pulling it over the sample toward the diagonally opposite corner causing the material to be rolled. Flatter and divide the sample as described in paragraph 3.3.A. or if the surface beneath the blanket is uneven, insert a stick or pipe beneath the blanket and under the center of the pile, then lift both ends of the stick, dividing the sample into 2 equal parts. Remove the stick, leaving a fold of the blanket between the divided portions. Insert the stick under the center of the pile at right angles to the first division and again lift both ends of the stick, dividing the sample into 4 equal parts. Remove 2 diagonally opposite quarters, being careful to clean the fines from the blanket. Successively mix and quarter the remaining material until the sample is reduced to the desired size as shown in figure 5.



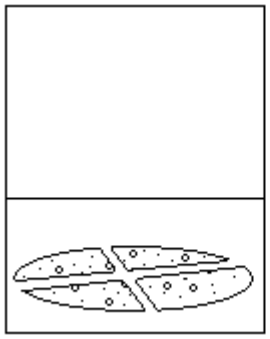
Cone sample on hard, clean level surface



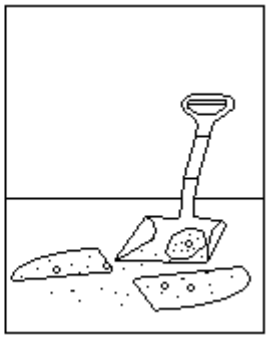
Mix by forming new cone



Quarter after flattening cone

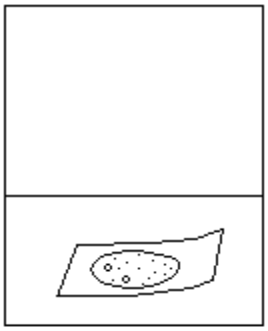


Sample into quarters

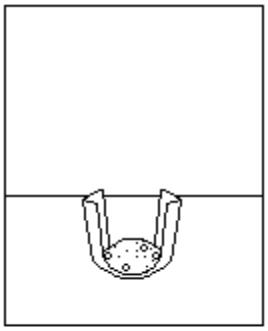


Retain opposite quarters
& Reject other two quarters

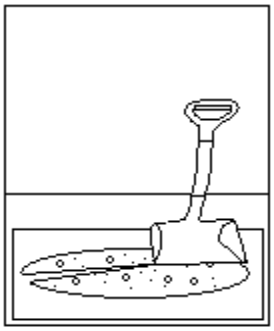
Figure 4



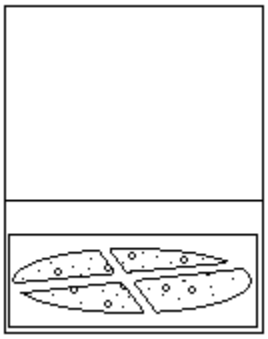
Mix by rolling on blanket



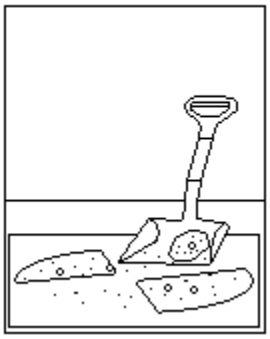
Form cone after mixing



Quarter after flattening cone



Sample into quarters



Retain opposite quarters
Reject other Two Quarters

Figure 5

4. Report:

None required.

5. References:

AASHTO R 76