

**Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate**  
**ASTM D4791 – 10**

**APPARATUS / SECTION 6.**

1. Proportional Caliper Device / Clause 6.1.1 – Fig. 2 & Fig. 3..... \_\_\_\_\_  
**Note 1:** Other devices may be found suitable if they meet the requirement of 6.1.1.1
2. Verification of Ratio Device / Clause 6.1.1.1..... \_\_\_\_\_
  - a. Machined Block..... \_\_\_\_\_
  - b. Micrometer..... \_\_\_\_\_
3. Balance / Clause 6.1.2
  - a. Accurate to 0.5% of the mass of the sample..... \_\_\_\_\_

**SAMPLING / Section 7.**

1. Field Sample / Clause 7.1
  - Sampled in accordance with ASTM D75 ..... \_\_\_\_\_
2. Sample Preparation / 7.2
  - Field sample reduced to an amount suitable for testing in accordance with ASTM C702? ..... \_\_\_\_\_
  - Desired mass of test sample (**See Chart**) will be the end result of the reduction procedure and after oven dried? ..... \_\_\_\_\_

Reduction to an exact predetermined mass is not permitted.

Nominal Max. Size Square Opening / mm (in.)	Minimum Mass of Test Sample, kg (lb)
9.5 (3/8)	1 (2)
12.5 (1/2)	2 (4)
19.0 (3/4)	5 (11)
25.0 (1.0)	10 (22)
37.5 (1 1/2)	15 (33)
50 (2.0)	20 (44)
63 (2 1/2)	35 (77)
75 (3)	60 (130)
90 (3 1/2)	100 (220)
100 (4.0)	150 (330)
112 ( 4 1/2)	200 (440)
125 (5.0)	300 (660)
150 (6.0)	500 (1100)

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**PROCEDURE / SECTION 8.**

1. Determination by Mass (Dried) or Particle Count (drying not necessary)/ Clause 8.1 & 8.2
  - Sieve sample (R/9.5 mm or R/4.75mm as required by specification) in accordance with ASTM C136? .....
  - Each of the required size fractions separated according to specification?.....
  - Each size fraction containing 10% or more of the original sample is reduced in accordance with ASTM C702, until approximately 100 particles are obtained for each of the required size fractions? .....
  
2. Method A - Flat Particles Test and Elongated Particle Test / Clause 8.3.....
  - Separated particles in each size fraction into 3 groups – (1) flat, (2) elongated, (3) flat & elongated, (4) neither flat nor elongated?.....
  - Use Proportional Calipers ( at specified ratio) as follows:  
  

**Flat Particle Test / Clause 8.3.1.1** - Set larger opening equal to the particle width. Particle is flat if the thickness can be placed in the smaller opening? .....

**Elongated Particle Test / Clause 8.3.1.1** - Set the larger opening equal to the particle length. The particle is elongated if the width can be placed within the smaller opening?.....
  - Clause 8.3.2 Determine proportion of the sample in each group by either count or by Mass?\_\_
  
3. Method B - Flat and Elongated Particle Test / Clause 8.4.....
  - Separated particles in each size fraction into 2 groups – (1) flat and elongated or (2) not flat and elongated? .....
  - Use Proportional Calipers ( at specified ratio) as follows:  
  

**Flat and Elongated / Clause 8.4.1.1** – Set the larger opening equal to the length of the Particle. The particle is flat and elongated if the particles least dimensional requirement (thickness) can pass completely through the smaller opening of the Caliper?.....
  - Clause 8.4.2 Determine proportion of the sample in each group by either count or by mass?\_\_

**CALCULATIONS / SECTION 9.**

- Clause 9.1 Calculate % of the flat and elongated particles to the nearest 1%?.....

**COMMENTS**