

# The Foam Index Test: A Rapid Indicator of Relative AEA Demand

## Introduction

The Foam Index Test is a rapid means to determine the relative levels of AEA needed for concrete containing fly ash and other materials that affect air entrainment in concrete. Although this document is directed towards the application of the Foam Index Test to evaluate fly ash, it can be applied to other pozzolans as well as the other ingredients of concrete, i.e., Portland cement, sand, coarse aggregate, admixtures and water.

## Equipment Needed

- 50 mL graduated cylinder
- 2 eyedroppers
- 1 glass 125 mL wide mouth jar (4 oz mason jar) with lid
- 1 plastic 250 mL bottle for making AEA solutions
- 1 balance

## The Foam Index Test Procedure

1. Place 20 g of cement in a 125 mL glass jar.
2. Add 50 mL of water to the jar, then cap and shake the jar and its contents for 1 minute.
3. Add diluted AEA solution (see Table 1) in small increments of 2 to 5 drops at a time. After each addition, cap and shake the jar vigorously for 15 seconds. Observe the stability of the foam.
4. The minimum amount of diluted AEA needed to produce a foam that is stable (bubbles exist over the entire surface) for 45 seconds is the FOAM INDEX of the cement mixture.
5. Repeat steps 1 through 4 using 16 g of cement and 4 g of fly ash to develop the foam index of the cement and fly ash mixture.

## Some Helpful Tips

Practice the procedure several times to become familiar with the process.

The 1:1 dilution of AEA is the minimum dilution recommended. Higher dilutions expand the range in which the stable foam occurs (see Table 1 for dilution details). Once you have determined what dilution works best for your materials, always use the same dilution rate.

**Table 1: Dilution of AEA**

Dilution	AEA (mL)	Water (mL)
1:1	50	50
1:2	50	100
1:4	50	200
1:5	40	200
1:10	20	200

- Adding the diluted AEA one drop at a time is the most accurate process, especially when trying to develop your ability to duplicate the test. You may want to add 5 drops at a time at first, with a high dosage rate material until you get near the “Index” level.
- A “Stable Foam” is achieved when no open areas of liquid show for at least 45 seconds. Bubbles will break rapidly at AEA levels below the “Index” level. Bubbles will still break for several increments above the “Index” level as well ... don’t continue adding AEA trying to stop the breaking bubbles. This point is difficult to judge at first. Run the same material several times in a row to help develop your “eye.”
- The Foam Index test is not designed to determine the actual AEA dosage rates for concrete. It is a good test to determine if specific materials will require more or less AEA relative to others. If the method is performed on the same materials, and a plot of the results charted against required AEA dosages, you may be able to correlate AEA dosage to the Foam Index test results.

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GCP0083 STRUX-46-1016



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