FAQ - About Compressed Air Foam Systems (CAFS)

Snuffer personnel and distributors conduct many CAFS demonstrations every year. Some frequently asked questions regarding CAFS are;

What is the definition of Compressed Air Foam (CAFS)?

The generally accepted rule is CAFS consists of one gallon (four litres) of water for one scfm of air. This rule will allow most systems to make the five types of CAFS foam from Class A foam chemical, injected at a rate of 0.2 – 0.4%.

What are the five types of CAFS foam and their applications?

(Using a 1-½" (38mm) pistol grip valve with a 1-3/8" ID ball)

1. Extra Wet Foam, Tip on – ¾" (19 mm), 1:1 expansion ratio. A very small straight bore tip is used to strip or break the bubbles to make a milk-like foam solution for fighting fibrous type fires – trash pile fires etc. Not used often.

2. Wet Foam, Tip on – 7/8" (22 mm) to 1-1/16" (27 mm), 2-4:1 expansion ratio. Provides good casting distance – sometimes used for initial attack. Only required on about 5% of fires. A thicker foam than in number one, it will stay longer on hot surfaces.

3. Medium Foam, Tip off, 8-9:1 expansion ratio. Still has good casting distance. Produces thick foam that will cut off a fire's oxygen supply. It stays much longer on hot surfaces and is used on more than 95.0% of fires (structures, petroleum, rubber, synthetics, automobiles, protection, etc.).

4. Dry Foam, Tip on 1-1/16" (27 mm), 11-12:1 expansion ratio. Water is restricted by one half so that there is ½ of a gallon of water to 1 CFM of air. It is used for protection, mop up, grass fire control, etc.

5. Extra Dry Foam, Tip Off, 15:1 expansion ratio. This foam is also used for protection, mop up, grass fire control, etc

Why is adding additional gallons or litres of water per cfm not generally accepted by knowledgeable CAFS users?

Adding 2-3 gallons (8-20 litres) of water per scfm makes a milky, very low expansion foam with a complete loss of bubble structure. This very thin layer disappears quickly as there is no shielding effects from multiple layers of bubbles. This idea is a carry over of water thinking where you must use as much water as possible. Early CAFS research quickly proved that medium foam was far more effective and safer. Extra water in the foam has about the same knockdown capability as aspirated foam and is several steps below what CAFS foam can offer. One hundred gallons of extra wet foam solution 1 – 1.5: 1 expansion makes about 150 gallons of foam. 42 gallons of CAFS foam solution on medium foam makes 320 gallons of foam. It should be noted that extra water foam increases the hand line weight dramatically and cannot be pushed as far, at a given pressure, as true CAFS foam can and more run off occurs. It takes a knowledgeable CAFS user a few seconds at a comparison demonstration to see that there is really no comparison between extra water foam and true medium CAFS foam for most knockdowns.

How far can regular wet and dry foam be pushed in a 1 ½"(38 mm) hose and how much is it expanded in the hose?

Wet foam is expanded about 12-14 times in the hose and dry foam over 20 times. Both foams can be pushed well over 4,000 feet (1400 meters) on level land.

Where do you see CAFS units being installed?

1. Stand alone trucks.
2. Back of tankers.
3. Retro fit to pumpers.
4. Stationary units in factories.

What are the new trends in CAFS?

1. Simpler CAFS operation 3-4 step operation instead of 6-10 required on earlier units.

2. The infinite control of air and water at the CAFS panel greatly inhibits the operator from knowing if he is making the right foam. Wet or dry operation is really all that is required to produce the five types of CAFS foam. The fire fighter has more control over the type of foam required – right at the hand line nozzle. Valve tip on or tip off produces wet and medium foam or dry and very dry foam.

3. Much better understanding of how CAFS should be applied i.e. slow painting motion and using the correct tip for various fire types.

4. Use of rapid response trucks 12,000 to 18,000 lbs GVW (5000 to 7500 kgs) with single or double CAFS systems on board. These units produce 375 to 1000 gallons (1400 to 3700 litres)/minute of medium foam. This is a much more effective system than a pumper truck on the ten types of fires most fire departments have to contend with.

5. When reviewing operating procedures of most fire departments if more than 2 attack lines are required then the department calls for backup. Therefore having large pumps is not of any benefit to the department.

What about the size of water pumps?

With training, CAFS users realize that large water pumps were good in their time but with CAFS smaller water requirements, much smaller water pumps can and should be used. Large 1200 to 2000 gallon/minute pumps only have a use in large industrial and residential complexes with large CAF systems. Eventually, smaller water mains could be used in towns and cities when CAFS are used extensively.

How does 100 gallons (375 litres) of plain water compare to 42 gallons (150 litres) of CAFS foam?

Fire Research for the last 30 years has shown that out of every 100 gallons of plain water applied to a fire, only about 5 to 10 gallons are actually available. Surface tension and gravity prevent the rest from being used. With 100 gallons of CAFS foam solution, almost all the water is put to use (90 to 95 gallons). This is because each CAFS bubble contains water, which sticks to the walls and ceilings.

Is CAFS a "be all and end all" fire fighting system?

No, but it is the next generation. CAF foam can be used in all fire situations except electrical and is far more effective.

How much water is actually used when fighting fires with water, aspirated and CAFS?

1. If we apply 100 gallons of plain water to a structure fire we get to use 5 to 10 gallons of it.
2. If we apply 100 gallons of aspirated foam to this same fire, we get to use 20 to 30 gallons of the water.
3. If we apply 100 gallons of water using Compressed Air Foam, we get to use 90 gallons of the water and we know the reason is because of the thousands of bubbles that are created per square foot instead of hundreds as in aspirated foam.