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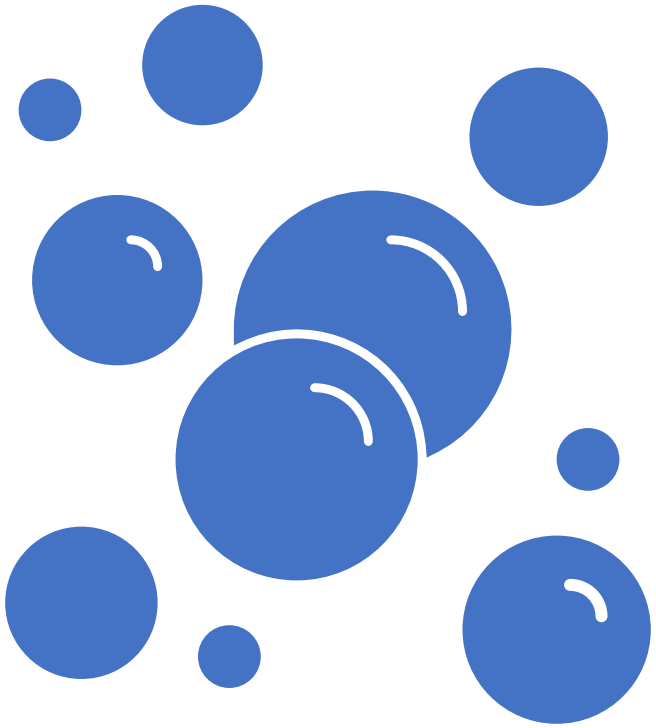

Welcome to CompressedAirFoam.com

CompressedAirFoam.com is an instructional organization. We are organized to promote a focused effort to deliver accurate information about the benefits and usage of Compressed Air Foam Systems. Our intent is to convey industry knowledge in an objective way to allow for pressure free education on this modern-day method of firefighting.

Foam Equipment Selection

The spec'ing and purchasing of a Foam / CAFS equipped apparatus can be a daunting endeavor that keeps apparatus committee members awake at night. Just when they think they've got everything lined up and all the decisions made, along comes additional information that brings up more questions and more contentious discussions accompanied by possibly unanticipated expenditures.

These CompressedAirFoam.com presentations should help clarify some of the additional hardware and foam concentrate products that will be required to make your Class A foam capable apparatus operate safely and to its maximum capability. It is highly recommended that you include ***certified Foam / CAFS on-site instruction*** in your apparatus specifications.

Without a doubt these decision processes will generate additional questions. That being the case, we encourage you to reach out to CompressedAirFoam.com (https://compressedairfoam.com/ask/) personnel who are globally considered "Subject Matter Experts" in the Class A foam and CAFS world.

We're here for you!

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Presents

An Introduction to:

Nozzle Aspirated Foam Systems (NAFS)

Principles and Applications

Why “Old School Nozzles” on new technology?

- Basically… many types of equipment serve the same purpose yet have drastically different results i.e. -

Head Protection

NAFS Nozzles

Proper equipment selection will make or break your NAFS applications!

Nozzle Aspirated Foam Systems (NAFS)

- Currently there is **NOT** a single “Do It ALL ” aspirating foam nozzle on the market! There are numerous tactical uses for Class A foam and many of these require specific nozzle types to maximize the benefits of Class A additives. A few common uses are:
- Fire attack with Class A solution via a combination nozzle.
- Attack, mop-up and overhaul with “Nozzle Aspirated Foam Systems” (NAFS).
- Pretreatment of various Class A fuel types.
  (Structural, Wildland & WUI)
- Construction of foam barriers to fire or anchors to burn out from.

The following primer will introduce NAFS nozzles and usage:

NAFS Nozzle Selection

- **<u>Fog Nozzle</u>** – Designed to break a solid stream of water into smaller droplets to increase surface area per gallon. Use of a NAFS *further increases* surface area per gallon.

- **<u>NAFS</u>** – Designed to create a low-pressure venturi effect **(Bernoulli's principle)** at the nozzle allowing atmospheric air to flow in. Internal devices create agitation to mix the air and foam solution into "Finished Foam". The carbon loving product expands providing much more surface area than the original volume of plain water.

NAFS Basics

Two Basic Types:

Front air inlet.

Rear air inlet.

Three Basic “Expansion Levels”:

Low Expansion.
Medium Expansion.
High Expansion.

Capable of using different classes of foam concentrate:

Class A or Class B or Specialty.

Least expensive route to producing “Finished Foam”.

Use with Batch Mixing, In-line Eductor or Electronic Direct Injection.

NAFS
Simple Rules of Thumb

- A few of the most *basic principles* for NAFS nozzle selection:

- 1) The *lower* the level of expansion, the *wetter* the finished foam.
- 2) The *higher* the level of expansion, the *dryer* the finished foam.
- 3) NAFS is discharged at low pressure, low velocity. CAFS is the opposite.
- 4) NAFS is capable of multiple levels of expansion. CAFS is low expansion only.
- 5) NAFS is subject to all normal hydraulic laws. CAFS is not.
- 6) NAFS ordinarily consumes concentrate at a higher rate than CAFS.
- 7) Most users agree that if you can only have one nozzle, a Mid-X nozzle is the most versatile and useful of NAFS.
- 8) The higher the expansion level, the shorter the stream reach will be.
- 9) Obstructed air inlets will product wetter foam / less surface area.
- 10) NAFS is an inexpensive force multiplier of your water supply.

NAFS Nozzle Evaluation

- Be aware that NAFS can expand the foam too far. This unintended over expansion causes the finished foam to be extremely dry which results in extended “Drain Time” that may slow the release of carbon loving water for fuel wetting.
- NAF bubbles are *generated in the nozzle*, not in the truck or hose. Selecting the right sized nozzle, providing the correct Class A concentrate percentage and proper nozzle working pressure and GPM are the keys to getting the greatest effectiveness.
- We recommend evaluating nozzles side by side onto real world targets such as wood siding, vehicles and typical wildland / WUI fuels. Observe the flows and make notes and video of the different foam types, bubble qualities and document drain times. Ensure all flow parameters are equal so it’s an apples-to-apples evaluation.

NAFS - Nozzle Comparison

- Side by side comparison of a variety of nozzles will show variations in stream quality, bubble type, reach and ease of use. Ensure testing is of equal expansion ratio's, equal concentrate percentage, same brand of concentrate and that all hydraulic parameters are correct for each nozzle.
- When assessing "Drain Times" of products produced by differing NAFS ensure application targets and atmospheric conditions are as equal as possible.

NAFS Nozzle Selection

- Having the ability to quickly and easily change expansion ratios with the same nozzle is an advantage but not a requirement.
- Using a quarter turn ball valve as the terminal control mechanism will allow quickly changing to different NAFS nozzles as tactical changes dictate.

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NAFS Nozzle Considerations

- 1) Know and operate within the OEM hydraulic parameters of the nozzle.
- 2) NAFS will work using any type of proportioning. Use of manual proportioning systems *may* add limitations and issues.
- 3) As expansion level increases, concentrate percentage *must* increase.
- 4) While working with NAFS in a high hazard area always provide a non-aspirated back-up hose line.
- 5) Ensure all NAFS are thoroughly FLUSHED with clean water after use.
- 6) NAFS are not designed to discharge CAFS. Nozzle damage may occur due to the high velocity flows of CAFS.

NAFS Nozzle Troubleshooting

- Rules of Thumb:
  - If “Solution” is blowing out of the back of the barrel or air inlets then your nozzle pressure is too high, reduce it via your nozzle ball valve.
  - If the “Finished Foam” being discharged appears as a wet mist or spray then your nozzle pressure is too high, reduce gradually at the ball valve or pump panel to achieve desired bubble structure. Most NAFS utilize low nozzle pressures.

NAFS Nozzle Selection - Summary

- The best practice in the creation of highly efficient Class A foam based firefighting products is to utilize a proper sized NAFS nozzle. The brand name is personal preference.
- Selection of the NAFS is based on hose line size, your desired flow rate, expansion level needs, desired foam type (wet -vs- dry) and flexibility in making changes on the fire ground. Remember: *Wet* for suppression and *Dry* for exposure protection!
- Arrange to have a variety of makes and models available to be evaluated and test flowed on the same day if possible. Video all of them in action and document the data for each!
- Contact experienced trainers and users at CompressedAirFoam.com for further information and tips. **Remember… *We're Here For You!***