



Hi-Combat® A

Class "A" Foam Concentrate



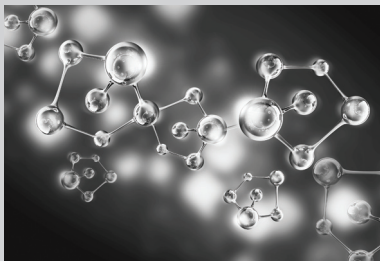
Integrity

Doing what's right, rather than what's convenient

Angus Fire prides itself on the open and honest way in which we conduct our business throughout the world. Our foams are an extension of our ethical beliefs and we pride ourselves in being the responsible foam manufacturer, balancing high performance with minimal environmental impact.

Fluorine Free Formulations

Environmentally Responsible Hi-Combat® A Class A foam concentrate, is a unique, fluorine free formulation providing unmatched firefighting performance and flexibility. Hi-Combat® A is specially designed for use in Class A/B foam systems and is excellent for Compressed Air Foam Systems (CAFS). When minimizing environmental persistence is paramount, Angus Fire's commitment and long track record of formulating specialty foam concentrates for minimal environmental impact and maximum performance offers Assurance.



- ✔ Environmentally responsible foam concentrate.
- ✔ 0.1 - 1.0 Proportioning
- ✔ UL listed as a Wetting Agent at 0.3% for Class A and Class B.
- ✔ Can be used with fresh, brackish and sea water.
- ✔ Exhibits good foamability, even in cold water.
- ✔ Contains NO alcohols for higher flash point and compatibility with Class A/B Systems.

Hi-Combat® A foam concentrate works in two ways. First, Hi-Combat® A improves the penetrating capability of water. It reduces the surface tension of plain water which allows it to penetrate surfaces where water might normally run off, to reach deep seated fires. This helps reduce the amount of water required to extinguish the fire and also provides quicker knockdown. Secondly, Hi-Combat® A increases the heat absorbing capabilities of water. Foaming ingredients give water the ability to adhere to vertical surfaces which allows the water longer contact with the fuel. The longer the water is in contact with the fuel, the more heat it is able to absorb. A coating of Class A foam may also be used for exposure protection to prevent fuels from igniting by raising their moisture content and providing a tough protective barrier to an oncoming flame front.

Typical Physical Properties

Appearance.....	Pale Green Liquid
Specific Gravity at 77°F(25°C).....	1.05
pH.....	9.0
Min Usable Concentrate Temp.....	20°F(-7°C)
Max Usable Concentrate Temp.....	120°F(49°C)
Freezing Point.....	6°F(-14°C)
Viscosity @ 70°F (21°C).....	20 cST
Viscosity @ 20°F (-7°C).....	32 cST
Surface Tension @ 0.1% Conc.....	25.7 Dynes/cm
Surface Tension @ 0.5% Conc.....	24.1 Dynes/cm
Flash Point: Pensky Martens: Closed Cup Method.....	>205°F

Standards and Approvals

- Meets USDA 5100-307A
- Underwriters Laboratories, Inc.
- NFPA 18
- NFPA 298
- NFPA 1145 (Structure Attack)
- NFPA 1150

Storage and Handling

Hi-Combat® A should be stored in its original shipping container or in tanks or other containers which have been designed for such foam storage. Recommended construction materials are stainless steel (Type 304L or 316), high density cross-linked polyethylene, or reinforced fiberglass polyester (isophthalic polyester resin) with a vinyl ester resin internal layer coating (50 -100 mils).



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Foam concentrates are subject to evaporation which accelerates when the product is exposed to air. Storage tanks should be sealed and fitted with a pressure vacuum vent to prevent free exchange of air. The recommended storage temperature range for Hi-Combat® A concentrate is 20°F (-7°C) to 120°F (49°C). When product is stored in atmospheric storage tanks, contents must be covered with 1/4-inch (6.35mm) of Angus Fire Seal Oil to ensure prevention of air coming into contact with the foam concentrate. Use of Seal Oil is only recommended in stationary storage tanks. Refer to Angus Fire product data sheet AFC700 for further information.

Hi-Combat® A foam concentrate is freeze/thaw stable. Should the product freeze during shipment or storage, no performance loss is expected upon thawing. Samples of Hi-Combat® A, premixed with potable municipal water supplies, have been shown to be stable and not suffer any significant loss of expansion or drainage properties after 30 days. Actual results may vary based on the water supply.

It is recommended that Hi-Combat® A not be mixed with any other type of foam concentrate in long term storage. Such mixing could lead to chemical changes in the product and a possible reduction in or loss of its firefighting capability. Most expanded foams are compatible for side-by-side application during an incident.

Shelf Life, Inspection, and Testing

The shelf life of any foam concentrate is maximized by proper storage conditions and maintenance. Factors affecting shelf life are wide temperature changes, extreme high or low temperatures, evaporation, dilution, and contamination by foreign materials. The expected shelf life of Hi-Combat® A foam concentrate is 20 years or more, if stored properly, according to the manufacturer's recommendations. Annual testing of all fire fighting foam

is recommended by the National Fire Protection Association (NFPA). Angus Fire provides a Technical Service Program to conduct such tests. Refer to Angus Fire product data sheet AFC400 for further details on Technical Service Program.

Environmental and Toxicological Information

Hi-Combat® A contains no ingredients reportable under the Superfund Amendments and Reauthorization Act (SARA) Title III, Section 313 of 40 CFR-372 or the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as of July 1, 1995.

Hi-Combat® A is biodegradable. However, as with any substance, care should be taken to prevent discharge from entering ground water, surface water, or storm drains. With advance notice, Hi-Combat® A foam concentrate or foam solution can be treated by local biological sewage treatment systems. Since facilities vary widely by location, advance notice should be given, and disposal should be made in accordance with federal, state, and local regulations.

The biological oxygen demand (BOD) and chemical oxygen demand (COD) of Hi-Combat® A are as follows:

<u>BOD₅</u>	
Concentrate.....	389,000 mg/kg
0.5% Sol.....	2,140 mg/kg
1% Sol.....	4,220 mg/kg

<u>COD</u>	
Concentrate.....	782,000 mg/kg
0.5% Sol.....	3,900 mg/kg
1% Sol.....	7,960 mg/kg

Tests for acute oral toxicity have proved negative. Hi-Combat® A concentrate is a primary skin irritant. Repeated skin contact will remove oils from the skin and cause dryness. Hi-Combat® A is classified as a primary eye irritant, and contact with

the eyes should be avoided. Users are advised to wear protective eyewear. If the foam concentrate enters the eyes, flush them well with water and seek immediate medical attention. For further details see the Hi-Combat® A Safety Data Sheet AMS225.

Structural Firefighting

Hi-Combat® A is a superior firefighting formulation for structural fire attack in the Municipal fire service. This formulation can be up to five times more effective than plain water on Class A materials. Hi-Combat® A isolates the fuel by excluding oxygen, adhering to Class A materials, and penetrating faster than plain water, which means less water damage and less water required. Hi-Combat® A can be used as a premix, batch mixed, educted, or injected into the water stream. Hi-Combat® A can also be used for exposure protection. When applying it for this type of application, it is advisable to use air-aspirated nozzles and/or CAFS. Opposing structures can be protected by a durable, insulating blanket of foam deflecting radiant heat. Hi-Combat® A significantly out performs plain water during the overhaul phase of structural firefighting. Acting as a time release capsule, it slowly releases its water, while adhering to walls, ceilings and other surfaces.

Forestry

Using Hi-Combat® A, the firefighter takes the offensive approach to attack the fire, minimizing the fire effects in the wildland/urban interface. The unique properties of Hi-Combat® A provide an excellent foam blanket, which can be created using back packs and all handlines. This ground application is particularly useful in building a fire line, and for direct attack, prescribed burning, and mop-up operations.

Hi-Combat® A is especially beneficial for any type of air attack, including helicopters and fixed wing aircraft. It is well suited to provide accurate and dependable proportioning

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through all types of on-board injection systems. Hi-Combat® A foam solution dropped from aircraft or helicopters will assist in controlling fire spread and greatly reduce the amount of time required and water used to successfully attack the fire. Hi-Combat® A's unique foaming capabilities create an excellent fire break by pretreating Class A materials to increase the moisture content of the fuel, thus inhibiting ignition.

Mining

Whether your mine fire emergency is above ground or underground, Hi-Combat® A allows you to take control. Hi-Combat® A's characteristics of fast wetting, cooling and penetrating allow excellent fire suppressing capabilities when applied through bore holes for deep seated underground mine fires. These same characteristics make it the agent of choice for stubborn surface mine fires as well.

The use of Hi-Combat® A as a compressed air foam in these types of applications can be most beneficial by actually flooding the mine area with a tough, durable blanket of foam. Hi-Combat® A allows more water to penetrate the deep seated fires thus creating steam, which reduces temperatures and assists in the extinguishment of the fire.

Industrial

Hi-Combat® A's specialized formulation is well suited in the industrial arena of fire fighting. The rapid control, fast wetting, and superior penetrating capabilities of Hi-Combat® A allow it to be very effective through fixed sprinkler systems as well as hose stream applications. Angus Fire manufactures a complete line of foam proportioning equipment and systems that are compatible with Hi-Combat® A for this application. Existing sprinkler systems can easily be converted to Class A systems. This is especially beneficial in paper

manufacturing, lumber and saw mills, as well as power generating stations having coal bunkers. Anywhere you find a Class A fuel hazard, you'll find Hi-Combat® A as the fire suppressant agent of choice.

Tire Fires

Tire fires are an extreme threat to the environment and can be one of the most difficult fires to control and extinguish. Hi-Combat® A has a proven track record for the extinguishment of these types of fires. Typically, thousands of gallons of water and often heavy earth moving equipment are required to extinguish a tire fire. The use of Hi-Combat® A will greatly reduce the amount of water and equipment required. The alternating application of Hi-Combat® A through aspirated and non-aspirated nozzles offer a penetrating and smothering blanket, allowing more water to get into the deep seated fire. This equates to less water, equipment, manpower and dollars spent to control and extinguish these tough fires. Not only is Hi-Combat® A environmentally friendly, it is your best weapon for rapid fire attack on these environmentally destructive tire fires.

Hydrocarbon Spill Control

Hi-Combat® A is also formulated for extinguishing and emulsifying hydrocarbon spills at a 0.3% application rate. Special care should be used when using Hi-Combat® A on Class B fire spill situations. The utilization of air-aspirating nozzles, over non-aspirating nozzles, may offer more effective control of these situations. Hi-Combat® A should be used on hydrocarbon spills ONLY. Class A foam should never be used on polar solvent or water miscible fuels.

Wetting Agents vs. Foam

Foam and wetting agents are not the same, as evidenced by development of separate NFPA standards within the same technical committee.

NFPA-11, Standard for Low Expansion Foam defines foam as a stable aggregation of small bubbles of lower density than oil or water that exhibits a tenacity for covering horizontal surfaces. It flows freely over a burning liquid surface and forms a tough air excluding, continuous blanket that seals volatile combustible vapors from access to air. The basic mechanism foam utilizes for extinguishment is to separate the fuel from oxygen eliminating one leg of the fire tetrahedron, thus interrupting the combustion process. In situations where a fire has been extinguished or ignition has not occurred, foam also serves to provide a visual confirmation that the surface of the fuel has been covered.

NFPA-18, Standard on Wetting Agents defines Wetting Agents as chemical compounds which, when added to water in proper quantities, materially reduce its surface tension, increase its penetrating and spreading abilities, and may also provide emulsification and foaming characteristics. Wetting agents generally contain a surfactant or emulsifying ingredient which enables them to mix (emulsify) with hydrocarbon fuels similar to oil and water in salad dressing. This is sometimes referred to as "encapsulating" or "locking up" the fuel.

Many fire service professionals are not aware there is a difference between foam, and wetting agents or emulsifiers. Understanding the above performance parameters and limitations of each will help the user determine the applicability of each agent for the intended use. Hi-Combat® A, along with being an excellent class "A" extinguishing agent, can also be used as an emulsifier on hydrocarbon fuel spills. However, Class B Wetting Agent listings do not extend to polar solvents or water miscible fuels.

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Typical Proportioning Settings

UL Listed Wetting	0.3%
Class B, Hydrocarbon Spill Emulsification	0.3%
Structural Fire, Attack and Overhaul	0.5%- 0.7%
Exposure Protection, Aspirated	0.7%-1.0%
Compressed Air Application.....	0.1-0.5%
Air Attack:	
Water Bombers and Helicopters	0.3%-0.6%

Suggested Structural Fire Application Rates

Fully Involved, Well Vented	0.33 gpm/sq. ft.
Half Involvement.....	0.17 gpm/sq. ft.
Quarter Involvement.....	0.09 gpm/sq. ft.
Overhaul.....	5-10 gpm/sq. ft.

Hi-Combat® A can also be used as a training foam for non-fire scenarios. Diluting 1 part Hi-Combat® A with 4 parts water provides a cost effective foam for training simulation. The diluted foam can then be proportioned at 1%, 3% or 6% to provide foam expansion similar to AFFF foam concentrates.

Ordering Information

Container	Shipping Weight	Shipping Dimensions	Part Number
5-Gallon Pails (19 liters)	46 lb. (20.9 kg)	1.13 cu. ft. ³ (0.032 cu. m)	3170-5340-6
55-Gallon Drums (208 liters)	506 lb. (229.5 kg)	11.51 cu. ft. ³ (0.326 cu. m)	3170-5481-6
275-Gallon IBC Reusable Tote Tank (1041 liters)	2541 lb. (1152.6 kg)	51.11 cu. ft. ³ (1.1061 cu. m)	3170-5725-6
330-Gallon IBC Reusable Tote Tank (1249 liters)	3043 lb. (1380.3 kg)	55.8 cu. ft. ³ (1.580 cu. m)	3170-5033-6
Bulk	8.80 lb./gal. (1.055 kg/l)		3170-5001-6



EMERGENCY FOAM SERVICE Call +1 610-363-1400 – 24 hours a day, every day