



KNOCKDOWN[®]

Class "A" Foam Concentrate

NFC700

- ✔ Environmentally acceptable 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.
- ✔ No intentionally added PFAS, PFOA or PFOS.
- ✔ USDA approved for use in aircraft, water scoopers, fixed bucket helicopters and ground engines



Source: US Forest Service



Knockdown foam concentrate works in two ways. First, Knockdown 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, Knockdown 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

Knockdown 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). Refer to National Foam Technical Bulletin NFTP100 for further information.

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 Knockdown concentrate is 20°F (-7°C) to 120°F (49°C).

Knockdown foam concentrate is freeze/thaw stable. Should the product freeze during shipment or storage, no performance loss is expected upon thawing. Samples of Knockdown, premixed with potable municipal water supplies, have been shown to be stable

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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 Knockdown 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. National Foam firefighting foam concentrates have been tested and have not shown significant loss of performance even after 10 years or more, provided annual testing and proper storage recommendations are followed. Refer to National Foam technical bulletin NFTB240 for recommendations on foam concentrate storage and preservation. Annual testing of all fire fighting foam is recommended by the National Fire Protection Association (NFPA). National Foam provides a Technical Service Program to conduct such tests. Refer to National Foam product data sheet NFC960 for further details on Technical Service Program.

Environmental and Toxicological Information

Knockdown 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, Knockdown foam concentrate or foam solution may 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 Knockdown are as follows:

BOD

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

COD

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. Knockdown concentrate is a primary skin irritant. Repeated skin contact will remove oils from the skin and cause dryness. Knockdown 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 Knockdown Safety Data Sheet NMS700.

Structural Firefighting

Knockdown 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. Knockdown 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. Knockdown can be used as a premix, batch mixed, educted, or injected into the water stream. Knockdown 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. Knockdown 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 Knockdown, the firefighter takes the offensive approach to attack the fire, minimizing the fire effects in the wildland/urban interface. The unique properties of Knockdown 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.

Knockdown 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 through all types of onboard injection systems. Knockdown 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. Knockdown'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.

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Mining

Whether your mine fire emergency is above ground or underground, Knockdown allows you to take control. Knockdown'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 Knockdown 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. Knockdown allows more water to penetrate the deep seated fires thus creating steam, which reduces temperatures and assists in the extinguishment of the fire.

Industrial

Knockdown's specialized formulation is well suited in the industrial arena of fire fighting. The rapid control, fast wetting, and superior penetrating capabilities of Knockdown allow it to be very effective through fixed sprinkler systems as well as hose stream applications. National Foam manufactures a complete line of foam proportioning equipment and systems that are compatible with Knockdown 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 Knockdown 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. Knockdown 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 Knockdown will greatly reduce the amount of water and equipment required. The alternating application of Knockdown 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 Knockdown environmentally friendly, it is your best weapon for rapid fire attack on these environmentally destructive tire fires.

Hydrocarbon Spill Control

Knockdown is also formulated for extinguishing and emulsifying hydrocarbon spills at a 0.3% application rate. Special care should be used when using Knockdown on Class B fire spill situations. The utilization of air-aspirating nozzles, over non-aspirating nozzles, may offer more effective control of these situations. Knockdown 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. Knockdown, 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.

Knockdown can also be used as a training foam for non-fire scenarios. Diluting 1 part Knockdown 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)	2170-2340-6
55-Gallon Drums (208 liters)	506 lb. (229.5 kg)	11.51 cu. ft. ³ (0.326 cu. m)	2170-2481-6
275-Gallon IBC Reusable Tote Tank (1041 liters)	2541 lb. (1152.6 kg)	51.11 cu. ft. ³ (1.1061 cu. m)	2170-2725-6
330-Gallon IBC Reusable Tote Tank (1249 liters)	3043 lb. (1380.3 kg)	55.8 cu. ft. ³ (1.580 cu. m)	2170-2033-6
Bulk	8.80 lb./gal. (1.055 kg/l)		2170-2001-6