

FIREBULL[®]
F3 Fluorine Free Foam

FIREBULL A/B Training Manual

STANDARD EQUIPMENT

FIREBULL A/B may be used with standard equipment provided the equipment is primarily designed to utilize water or foam as a medium of fire control:

NOZZLES (aspirated and non-aspirated nozzles, foam tubes and multi-purpose jet spray and fog nozzles).

EDUCTORS (inline, by-pass etc.)

PROPORTIONERS (on board, around the pump etc.)

PRE-MIXED (in portable extinguishers or fixed tanks etc.)

FIREBULL A/B is non-corrosive to gaskets, fire hoses, nozzles, sprinkler systems and fire fighting apparatus. Because it has lubrication qualities, the product has a beneficial effect on hardware life expectancy. A single water flush effectively cleans equipment.

Because FIREBULL A/B may be diluted with potable water, seawater or brackish water, equipment can be replenished from any convenient water supply.

STORAGE

FIREBULL A/B should be stored between 32 – 130 Degrees F. It is best to store FIREBULL A/B in shelter out of the sun. The product does not have issues with UV light however it is best for the container to be stored out of direct sun light. If FIREBULL A/B freezes it is ok to just thaw it out. Freezing has not shown to hurt the product.

* If stored in direct sun light the UV may cause discoloration. The result is a clear amber colored product. This does not hurt the FIREBULL A/Bs performance. *

FILLING AN ON-BOARD AGENT TANK

Since there could be a risk of incompatibility of old agents or products with FIREBULL A/B, it is recommended that the agent tank is drained of any foam or wetting agent prior to filling with FIREBULL A/B.

FIREBULL A/B will NOT react violently or create a hazardous situation if it meets other water additives or foams; however, it is always good practice to drain and thoroughly rinse the tank with fresh hot water before filling.

To fill the tank with FIREBULL A/B, simply pour from the 5-gallon container directly into the agent tank while ensuring all valves are closed. 55-gallon drums and 250-gallon totes can be pumped using a standard suction pump, or by using a drain valve to fill smaller containers for use to service the tank.

ATTACK LINE with FIREBULL A/B

A) Fire Departments using FIREBULL A/B in truck tanks that are proportioned at the pump panel usually dedicate that line as the initial fire attack line. This way, the FAO / Engineer can dial in the desired dilution of FIREBULL A/B with water (usually .25%-.5%). That line is used as the initial attack line. It can be a 1.5/1.75, or a 2-1/2" hand line.

Important: The eductor GPM must match the nozzle GPM to achieve the proper finished product. Also, pump pressure must be as per the recommendation of the eductor manufacturer (usually 200 PSI at the pump).

B) Mechanical eductors can be placed at the discharge outlet at the pump panel with the attack line attached to the eductor as the attack line. This procedure will allow for the education of FIREBULL A/B from a 5-gallon container using the pick-up tube procedure. Matching GPM rates and pump pressures are required here like those running off the in-truck proportioning system.

C) Mechanical eductors can be placed in between two hand line sections to achieve FIREBULL A/B introduction to that hand line. It is important to note that 200 feet of hose is the maximum length that can be used without losing some of the flow / pressure / concentrate. (e.g., You can place a 125 GPM eductor after the first, second, or third section of hose line to conserve product usage; however, NFPA and IFSTA recommend that when using a mechanical in line eductor, 100 feet is the maximum distance between the nozzle and the eductor to achieve maximum performance.)

SUPPLYING FIXED EXTINGUISHING SYSTEMS

This guideline is recommended when using FIREBULL A/B to supply fixed extinguishing systems. As an example, we will use a warehouse with a fixed sprinkler system that has fire department connections on the outside of the building.

Application Procedure

- A) Pumper Hook Up and Supply
 - 1) The incident commander (IC) can instruct an arriving engine company to connect into the fire department connection to feed the sprinkler system. If the pumper has an in-truck FIREBULL A/B tank, a 2-1/2" supply line can be connected to the sprinkler system connection. Then the proportioner and valve controls are set to flow FIREBULL A/B from the tank through the house line that is supplying the sprinkler system. The dilution is determined by the type of materials burning, quantity, etc.
 - 2) For those pumpers without an in-truck FIREBULL A/B tank, a mechanical eductor can be placed at the discharge outlet at the pump panel. Using a pick-up tube and FIREBULL containers, the FIREBULL can be introduced into the hand line currently supplying the sprinkler system with FIREBULL A/B and water.
 - 3) Pre-mix Booster Tanks on Engine Companies, or Pre-mixed Tankers containing large quantities of water and FIREBULL A/B, can be used to supply the sprinkler system from the outside.
- B) Pre-Mixed and Attached FIREBULL A/B Tanks Supplied to Sprinkler Systems
 - 1) FIREBULL A/B can be pre-mixed in above or below ground water supply/ distribution tank systems and used for the water supply of the fixed system.
 - 2) FIREBULL A/B concentrate tanks can be installed adjacent to the sprinkler system utilizing an eductor system for proportioning. The water supply passes by the eductor/proportioner thus introducing FIREBULL into the sprinkler piping system and discharging at the sprinkler heads.

FIREBULL AB QUICK PRE-MIX TABLE

QUICK PRE-MIX TABLE FIREBULL Premix Rate (Gallon)				
TANK SIZE Gallons	0.25%	0.5%	1.0%	3.0%
300	.75	1.50	3.00	9.00
500	1.25	2.50	5.00	15.00
750	1.875	3.75	7.50	22.50
1000	2.50	5.00	10.00	30.00
1250	3.125	6.25	12.50	37.50
1500	3.75	7.50	15.00	45.00
2000	5.00	10.00	20.00	60.00
2500	6.25	12.50	25.00	75.00
3000	7.50	15.00	30.00	90.00

PRE-MIXING THE BOOSTER TANK

This guideline is recommended when using FIREBULL A/B to pre-mix a Booster Tank. The amount of FIREBULL A/B to be added will be determined by the tank capacity (E.G., to achieve a 1% concentrate in a 500-gallon capacity booster tank, you must add 5 gallons of FIREBULL A/B).

Mixing Procedures for Booster Tanks

Simply pour the appropriate amount of FIREBULL A/B into the water to achieve the desired concentrate of water and FIREBULL A/B then drive truck around for agitation! The FIREBULL A/B and water are now a stable solution with no separation occurring.

Measuring Percentage of FIREBULL A/B Concentrate after Booster Tank Usage

After the pre-mixed booster tank has been used and the engine is to be re-serviced, we recommend that a measurement be made to ascertain the remaining level of water and FIREBULL mixture. Once this has been determined, the crew can calculate how much FIREBULL A/B and water are required to refill the booster tank.

Re-Servicing Tank Water from a Hydrant When Pre-Mixing FIREBULL A/B

(500 Gallon Water (Booster) Tank is Used as the Example)

While operating at a fire where the FIREBULL A/B / booster tank water (500 gallons) has been used for the attack line and is now depleted, the following procedure can be used to quickly re-serve the tank from a hydrant, and again pre-mix the booster tank with FIREBULL A/B to achieve your desired concentrate.

- 1) While hooked up to a hydrant supply line, the engineer can simply continue feeding the attack lines with water as the engineer opens (1/2 gate opening) the tank fill valve and fills the tank with water.
- 2) With the tank now filled with 500 gallons of water, another 5 gallons of FIREBULL A/B is poured directly into the water tank to achieve that 1% pre-mixed solution. It is not necessary to circulate or agitate the FIREBULL A/B and water together. Once the FIREBULL A/B is poured into the water; it becomes ready for use again through all the attack lines. The engineer now opens the tank to pump valve and the 1% of FIREBULL A/B / water will flow through the hand line.
- 3) There is no cause for alarm if some bubbles appear from the top of the tank water. Remember, FIREBULL A/B is Non-Corrosive, Non-Toxic, Non-Hazardous, and Biodegradable. The bubbles will go away almost instantly without any additional wash-down needed.

AERIAL and MASTER STREAM APPLIANCES

This guideline is recommended when using FIREBULL A/B through Aerial and Master Stream appliances. Aerial equipment and master streams can be used to introduce FIREBULL A/B for large scale offensive and defensive attacks.

Example Consider a commercial strip mall with a collapsed tar and gravel roof. Assume the contents of the mall, and the roof material is burning.

AERIAL ATTACK AND APPLICATION PROCEDURE USING
MASTER STREAM / MONITOR AND FIREBULL A/B

A) FIREBULL A/B can be educted from the inlet of the waterway by a 2-1/2" eductor. A 2-1/2" or 3" hose line can be used as the feeder line to the aerial monitor. It may be necessary at times to use more than one water supply line to achieve the total flow rate of the monitor. Depending on the size of the fire and building(s), additional aerial units may be needed to achieve extinguishment. A stubborn tar/roof fire or a burning flammable liquids storage facility can be brought under control with FIREBULL A/B through a safer, defensive mode attack. If FIREBULL A/B is applied with water to the surface of the burning material, extinguishment can be achieved.

FIREBULL A/B can be introduced through Master Streams such as deck guns and large diameter hand lines. FIREBULL A/B is educted through mechanical or truck proportioning systems at rates to achieve desired percent concentrate. Good results can be achieved from a defensive attack while providing for a safer extinguishment environment.



What is a Class "A" Fire?

Fires involving Wood / Paper / Cotton / Hay / Coal / Tires / Wild Land / Automobiles / Building Structures / Cotton / Fiberglass (Solids)

Real life application procedures – Class "A" Fires

FIREBULL A/B is used on Class "A" fires in dilutions ranging from 0.25% to 1%.

The key to rapid and efficient extinguishment is based on effective surface area coverage and product penetration into the burning material. We recommended an application technique using a broken fog pattern for initial fire extinguishment.

The broken fog is between a 30 – 40-degree pattern.

Aiming at the base of the flames or apparent heat source sweeping, or in some cases, showering the fire out.

REMEMBER the faster FIREBULL A/B is spread, the faster it will achieve total extinguishment.

After successfully extinguishing Class "A" fires, come back with another application for a quick "overhaul" of the area to cool all hot spots.

Note: Straight stream applications are needed for Class "A" depth fires.

FIREBULL A/B requires one application, when used properly to extinguish Class "A" fires and overhaul the area.

Surface fires utilizing FIREBULL A/B

Wood, pallets, cotton, hay, garbage, etc., can usually be attacked initially with a broken fog pattern followed by a straight stream for penetrating and cooling all hot spots.

Recommended dilution with water: 25% to .5% for this type of fire.

Deep seated fires utilizing FIREBULL A/B

Timber piles, garbage piles, cotton bails, hay bails, sawdust piles, coal piles, peat bogs, rubber tire piles any type of deep-seated fire, to extinguish surface flames, FIREBULL A/B should be applied with broken fog or aspirating equipment. After all surface's flames have been extinguished, straight stream application is needed to penetrate deep down into burning material beneath surface visibility.

Some deep-seated fires form a "hard shell or crust" over the top of the burning material, especially if the fire has been burning for a long period, they often require additional equipment besides fire lines e.g. thermal cameras to locate hot spots, piercing nozzles, heavy equipment for breaking up and moving piles around etc.

Recommended dilution with water: .25% to .5% for this type of fire.

CLASS "A" FIRES APPLICATION PROCEDURES

Structural fires involving residential homes, kitchens and industrial buildings

Proper protective fire fighting gear is recommended for fighting any type of fire.

Using Standard Operation Procedures for fighting these types of fires, add FIREBULL A/B into hand lines or aerial applicators through, Truck Foam Systems, Batch Mixing or Inline Eductors for rapid heat and flame extinguishment. FIREBULL A/B is used for both interior and exterior fire applications will result in immediate heat reduction, fire extinguishment, and smoke reduction. Final overhaul operations are cut significantly compared to using foams or wetting agents.

Before the development of FIREBULL A/B a 1-1/2" hand line would have been needed for extinguishing interior home fires. Fire Departments that now use FIREBULL A/B have found that they can enter a burning kitchen fire or living room fire with 2-1/2 gallon water fire extinguishers and accomplish complete extinguishment using only 2 to 4 units without causing massive water damage to the rest of the home.

FIREBULL 200 has achieved outstanding results utilizing 2-1/2 gallon units for the initial attack for rapid knockdown especially when lives have been at stake in trapped situations. We suggest using (2) 2-1/2 gallon units for extinguishment and (2) units for cool down.

We DO NOT in any way recommend Fire Departments to discontinue using their hand lines.

Proper protective fire fighting gear is recommended for fighting any type of fire.

Using FIREBULL A/B on vehicle fires

Owing to the extensive variety of composite materials used in modern vehicles, such fires are known to be difficult to extinguish. Fighting these fires is challenging and with traditional agents there is very little penetration, limited cooling, wasted water, increased wear and tear on equipment and fatigue to Fire Fighters. All these take their toll and jeopardize the safety of Fire Fighters and road users.

Fully involved vehicle fires will take anywhere from 200 gallons of water to 500 gallons of water for extinguishment and anywhere from 1,000 to 2,000 gallons of water to semi cool the metal surfaces of the vehicle without complete cooling of the vehicle. Tow truck and salvage drivers often experience re-ignition of vehicles after crews have used a full tank of water to extinguish the vehicle.

Some Fire Departments are still using a pre-mixed booster lines to attack a car fire. Others are using a 1.5, 1.75 jump, or trash lines, some are using a pre-connect cross lay and others are using 1.5", 1.75", foam packs, etc.

FIREBULL A/B can be pre-mixed in the booster tank or upon arrival on scene or prior to arrival. Normal movement of apparatus to the fire scene is enough to mix the agent. When FIREBULL A/B is pre-mixed in the booster tank, and the Engine Company is on the scene, the tank valve is opened, and the attack line valve is opened and charged. The line supplies a .25% - 1% solution through the hand line to attack the vehicle fire.

The attack line crew can extinguish a fully involved vehicle from a safe distance. It has also been noted that a fully involved vehicle is extinguished in a matter of a few seconds with minimal use of water and FIREBULL A/B (up to 75 gallons for complete extinguishment and overhaul has been the standard).

It's recommended to use .5% on fully involved vehicle fires.

When fire consists of more than Class "A" materials the pre-mix needs to be higher for Class "B" or Class "D" fires.

Adding additional FIREBULL A/B to booster tank or adjusting eductor setting achieves the higher percent.

In-line eductors are ideal for adding FIREBULL A/B into a hand line. The setting is determined by turning the percent dial to .5%, 1%, 3% or 6%.

Extinguishing vehicle fires using FIREBULL A/B, in-line tank, with pump panel proportioner and valve control

When the attack line is the dedicated FIREBULL A/B in-tank proportioned line, the proportioner at the pump is set at .25% - .5% and the valves are opened to provide the flow of product.

The pump operator should be familiar with the sequencing of the in-tank, pump proportioning system.

Manufacturer's recommendations and manual for that system should be followed in order to achieve proper rates and flows.

Extinguishing vehicle fires using FIREBULL A/B with in-line eductors

95gpm / 125gpm / 250gpm

A mechanical eductor can be used to introduce the FIREBULL A/B into a hand line for fighting vehicle fires. In most cases, the eductor is placed at the discharge line outlet that will be supplying the attack line. It is imperative that the GPM rating of the eductor matches the GPM setting of the nozzle being used.

Example

If you are using a 125 GPM eductor, the nozzle must be set to 125 GPM.

If the nozzle selection is 95 GPM, you will not achieve education of the product from the container. Also make sure that all hose is the same diameter 1.5" and 1.75" Hose both use 1.5" couplings.

This is the primary reason for failure to induct product through a hand line.

It is also imperative that the gate on the nozzle, or the nozzle itself, be completely open in order to achieve proper education and flow of product through the hand line.

Pressure of 200psi at the pump is a standard recommended by most eductor manufacturers.

Enough pressure at the eductor is required for the FIREBULL A/B to be picked up through the tube and displaced through the hand line.



WHAT IS A CLASS "B" FIRE?

Fires and spills involving: Non-Polar and Polar Solvents

Gasoline
Diesel
E-85
E-95
Jet A
JP4
JP5
JP8
Crude Oils
Kerosene
Tires
Methanol
Isopropyl Alcohol
Methyl Ethyl Ketone (MEK)

FIREBULL A/B Flow rates and Procedures on Class "B" Fires

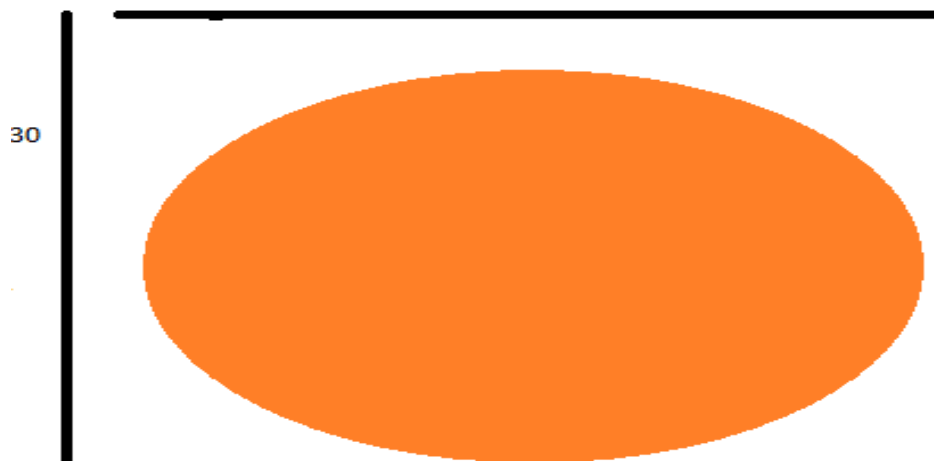
Once the type of fuel has been identified, it is necessary to calculate the surface area of fuel involved. Once the area has been calculated, simply multiply the area in square feet by the Class "B" application rate to calculate the amount of total solution rate (i.e., nozzle flow rate) required to extinguish the hazard.

EXAMPLE

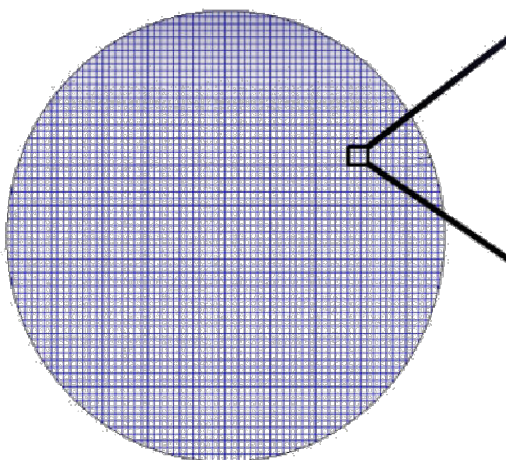
1. Determine Area of Hazard

Length X Width = Sq. Ft. of Fire

30



2. Choose Appropriate Application Rate (.1gpm/ Sq.Ft. for Hydrocarbon)
3. For every square foot over a 15-minute period, .10 Gallons of foam solution is required to meet the application recommendations of NFPA 11 for a spill fire



4. Rate x Area = GPM of Foam Solution

How much water and foam is needed to fight the fire per minute.

5. Solution GPM x % Used (.97 = 97%) = Water GPM
6. Solution GPM x % Used (.03 = 3%) = Concentrate GPM

How much foam concentrate is needed per minute?

7. Water GPM x Time = Total Water

8. Concentrate GPM x Time = Total Concentrate

- *Storage Tanks - 60 Minute Flow Time*
- *Spills - 15 Minutes Flow Time*

Like structural fire attack, a minimum flow rate is recommended. Even at a spill without fire, it is still highly recommended that the standard application rate be applied. The reason for this is based on our safety. If the spill ignites, we need maximum firepower to control the unexpected! Also, like in structural fire attack, have a backup hoseline in the event you lose foam during the incident. Remember, a backup line should flow equal to or greater than what the attack line flows.

Duration is the amount of time that the application of foam must be delivered to create a finished foam blanket that will provide a vapor barrier and prevent reigniting. The length of time that this barrier will last before a reapplication is necessary is also dependent on the environment (such as wind), the temperature of the spilled product (hotter fuels will degrade a foam blanket faster), and type of fuel that you are interacting with. NFPA 11 identifies a minimum of a 15-minute application of foam at the required rate as a minimum typical for a spill (IFSTA Principles of Firefighting Foam covers this point in great depth.)

Use 6% concentration at .03 gpm per sq ft for ethanol and alcohol based blended fuels.

The amount of application that's required is measured in terms of gallons per minute, per square foot.

Training Scenario

Using the requirements, we have listed, let's use a simple scenario and see how it all plays out.

The scenario is a tanker rollover (a spill is considered less than one inch deep) from a fuel tank on a commercial vehicle. The spill takes up an area of about 40 feet by 50 feet and it has found an ignition source. The fire department incident commander (IC) has determined that the application of foam will be required. Using the data above, the IC considers the following elements: " The spill is a hydrocarbon and requires an application rate of 0.10 gpm/ft² " The department uses a 3 percent AFFF concentrate, which requires the 3 percent setting for hydrocarbon spills and fires " The area of the spill is 2000 square feet " This requires a flow rate of foam solution of no less than 200 gpm " The logistics of such an application rate should be considered for 15 minutes " Based on these minimums, we see that the crews should be able to flow a foam solution through the on- board system or educator that consists of 6 gallons per minute of concentrate, and 194 gallons of water per minute for a 15-minute application. This requires 90 gallons of foam concentrate and about 2,910 gallons of water to maintain the foam application

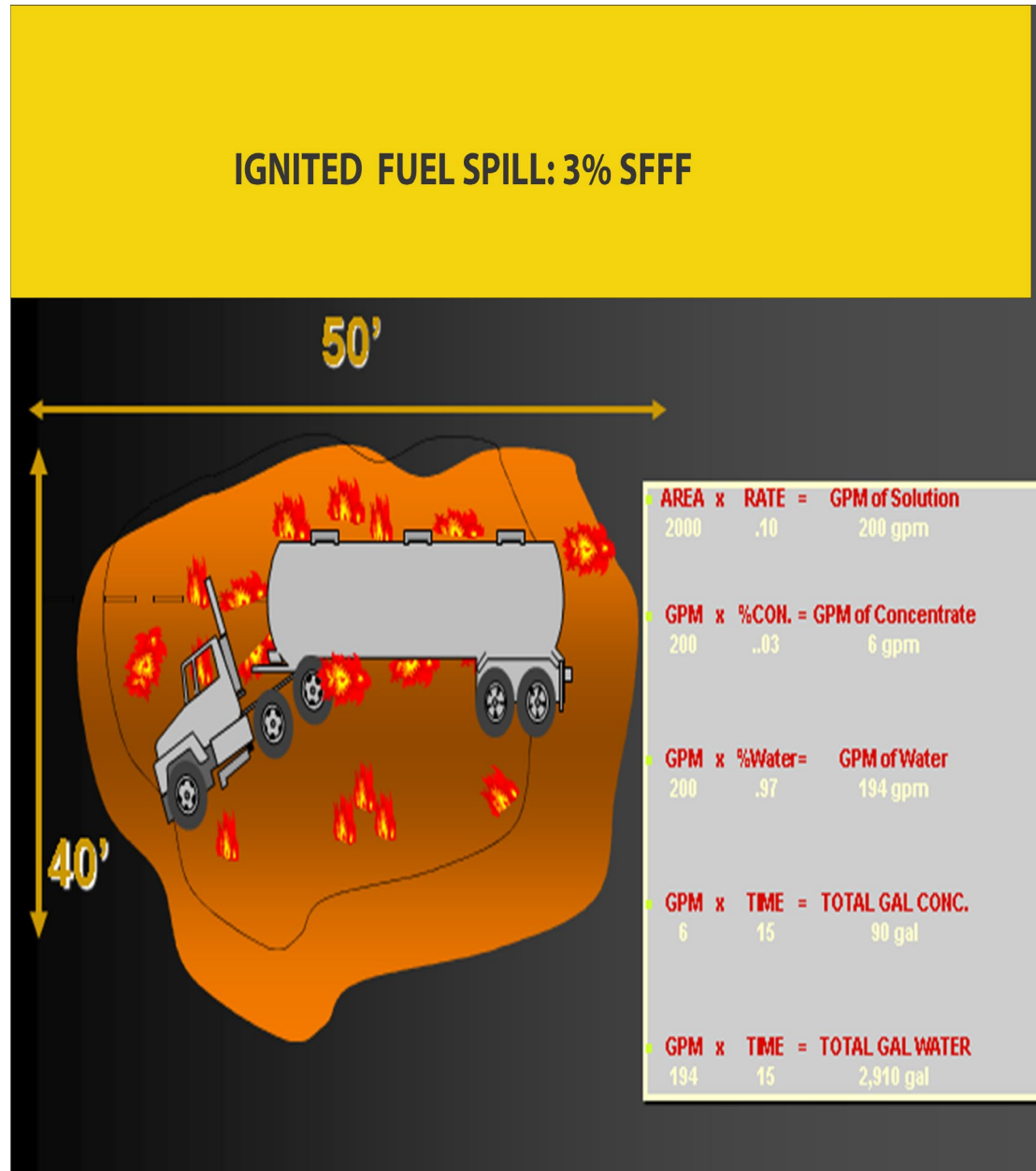
The exactness of tabletop calculations always goes out the window at the scene of a fire or emergency. Our goal is to error on the side of safety and to provide enough agent to safeguard us and the community we are charged with protecting. It pays to have extra resources available for a cushion of safety.

The benefit of the tabletop exercises is that it does give you an idea as to the theoretical details required. So long as you have a working knowledge of the concepts,

you'll be able to apply the theories with some degree of accuracy even during the extreme stress of the emergency. ***Next Page***

Method of Application

When applying Foam products there are 3 methods for getting the Foam onto the fire.



1. **Banking** – Try to bank the stream off something to ease the force of the foam hitting the fuel

2. **Rolling** – Sweep the nozzle stream in front of the fuel and build a wave of foam up to push into/over the top of the fuel.
3. **Rain Down** – Direct the nozzle high above the Fuel surface and allow the Foam to rain down onto the fuel surface.

Firefighting Technique

Part I

Fire Extinguishing Agent

Foam

Foam Properties
Working Principle
Application of Foam



NEVER Spray the foam directly into the fuel unless it's the only option.

What is a Class "D" Fire?

Fires involving Metal – Magnesium, Aluminum, Titanium, Lithium, Etc.

Real life application procedures – Class "D" Fires

FIREBULL A/B is used on Class "D" fires in dilutions ranging from 6% to 10%.

The key to rapid and efficient extinguishment is based on effective surface area coverage and product penetration into the burning material. We recommended an application technique using a smooth bore for fire extinguishment.

If a fog nozzle is used (Car Fire) use a straight stream pattern.

Aiming at the base of the flames and keep the stream on the fire. We are trying to cool the fire to make the metal stop combusting.

REMEMBER the cooling capability, FIREBULL A/B will cool the fire quickly and achieve total extinguishment.

After successfully extinguishing Class "D" fires, come back with another application to cool all hot spots.

Note: Metal Fire can explode. Always keep Max distance. Always use extreme care.

What is a Class "K" Fire?

Fires involving Hot Fat Fryers

Real life application procedures – Class "K" Fires

FIREBULL A/B is used on Class "K" fires in dilutions of 6%

The key to rapid and efficient extinguishment is based on effective surface area coverage.

We recommended a gentle foam application. You never want to direct a stream into a Hot Fat Fryer. Foam tube work great for these fires. Use a banking technique if possible.

If a fog nozzle is used use a 30 – 40-degree pattern.

After successfully extinguishing Class "K" fires, work on cooling the whole fryer structure.

Note: Fat Fryer fires can become violent when water containing liquids are added. Always use extreme care.

Class K

The product will work on K fires. Again use care when applying as water/foam can make the oil pretty angry. Use a 6% concentration and the most gentle application you are able to. Some FD's like a foam tube to make for a more gentle application. We advise at least using a banking application, unless it's the only option don't spray directly into the hot oil.