



**AIRTANKER BASE, HELICOPTER  
DIP TANK & ON-BOARD  
OPERATIONS**

MODULE 7

[WWW.BLAZETAMER.COM](http://WWW.BLAZETAMER.COM)

# BLAZETAMER380™ AERIAL WATER ENHANCER



The goal of this Module is to illustrate how to easily BLAZETAMER380™ can be incorporated into each of the following:

- ✓ Airtanker base and helibase operations
- ✓ Helicopter dip tank operations
- ✓ On-board injection systems in helicopters, scoopers and ground-based airtankers

# BLAZETAMER380™ Aerial Water Enhancer



*Alaska DNR delivered 80,000+ gallons of BLAZETAMER380 to Fires in their contracted CV-580's and RJ-85's from Saskatchewan in 2019*



*PALMER, ALASKA*



*, WILDFIRE in COLORADO*

*Colorado DFPC delivered 40,000+ gallons of BLAZETAMER380 to fires In their contracted P-3 in 2020.*

# WATER ENHANCER QPL



US Forest Service

Washington Office

Fire & Aviation Management

October 5,  
2020

## Water Enhancers for Wildland Fire Management

Qualified By US Forest Service in Accordance with Forest Service Specification 5100-306b

These products are evaluated, qualified, and approved for use only at the specified mix ratio range with the indicated application equipment.

Consult individual agencies for specific policies relating to water enhancer use. Please review the Notes for Selection and Use

APPROVED FOR  
MULTI-ENGINE & SEATS

Definition: Water Enhancers contain ingredients that alter the physical characteristics of water to increase effectiveness and adhesion to fuels. They are not retardants. They depend on the water they contain for their effectiveness.

Chemical	Mix Ratio <sup>1</sup>	Qualified Applications <sup>2</sup>				Ground Engine
		Fixed-Wing Airtanker		Helicopters		
		Multi Engine	SEATS	Fixed Tank	Bucket	
<b>Uncolored Concentrates</b>						
Barricade II	1.0%	3	•	-	•	•
Barricade II	1.0% - 3.0%	-	-	-	•	•
Thermo-Gel 200L	0.5% - 3.0%	3	•	-	•	•
Thermo-Gel 500P	0.4% - 0.5% [0.03-0.04 lb/gal]	3	•	•	•	•
Thermo-Gel 500P	0.4% - 1.2% [0.03-0.10 lb/gal]	3	•	-	•	•
Firewall II (formerly Wildfire AFG Firewall II)	0.25% - 3.0%	3	•	•	•	•
BioCentral Blazetamer 380	0.65%	3	•	•	•	•
FireIce 561	1.4% - 2.1% [0.12-0.18 lb/gal]	3	•	-	•	•
Phos-Chek Insul-8	0.37%	3	•	•	•	•
Phos-Chek Insul-8	>0.37% - 1.0%	3	•	-	•	•
Phos-Chek Insul-8	>1.0% - 3.0%	-	-	-	•	•
EarthClean TetraKO XL-P	0.5%-1.5% [0.04-0.13 lb/gal]	3	•	-	•	•
<b>Colored Concentrates</b>						
FireIce HVB-Fx	1.7%-2.7% [0.14-0.23 lb/gal]	3	•	-	•	•

**NOTES:**  
3 Forest Service policy does not allow use of water enhancers from large airtankers. **These products meet the requirements for application from multi-engine aircraft for those agencies whose policy permits this use.**

**Notes**

1 Each product is qualified for the specified mix ratio or range. Mixtures **outside the mix ratio or mix ratio range shown** are **not** qualified for use. Mix ratio is described as the percentage of product in water. Mix ratios for dry concentrates may also be described as pounds of concentrate added to 1 gallon of water. This description is shown in brackets.

2 Qualification Notes

- **Fully Qualified** – Product complies with all requirements of a formal specification.

# BLAZETAMER380™ AIRTANKER BASE OPERATIONS



**Airtankers can load either retardant or  
BLAZETAMER380™ without rinsing tanks  
between loads**

- ✓ There are no negative affects to equipment if the tank of an aircraft contains residual amounts of another suppressant, is filled with water and BLAZETAMER380™, and then dispensed through a door or gate system.
- ✓ Salts in retardant do not affect BLAZETAMER380™

## EQUIPMENT NEEDS

- ✓ Water pump - 250-550 gpm volume pump
  - Suction hose to pump (if hydrant is not used)
  - 3" hose from pump to Injection System
  - 3" loading hose to aircraft or dip tank
- ✓ Additional pump required if optional batch tank is used
- ✓ Miscellaneous camlock fittings and valves
- ✓ Loading valve for aircraft

# BLAZETAMER380™ AIRTANKER BASE OPERATIONS & HELICOPTER DIP TANK OPERATIONS



- ✓ SEAT Service Vehicles are equipped to inject, batch mix, blend and load aircraft or helicopter dip tanks
- ✓ May be used at temporary bases or to create an additional pit at permanent bases



SEAT Service Vehicle with batch tank



Several vendors are available to support fires throughout the USA

- ✓ Portable Mixing Equipment and Dip Tanks are available from vendors to provide turn-key service at airtanker bases or to support helicopter dip tank operations

# BLAZETAMER380™ DIP TANK OPERATIONS



Dip Tank Operations on multiple fires in California – over 200,000 gallons in 2020

- ✓ North Complex
- ✓ Red – Salmon Fire
- ✓ Bobcat Fire



# BLAZETAMER380™ DIP TANK OPERATIONS



When BLAZETAMER380™ is used in helicopter dip tanks, to maintain the desired mix ratio of blended product, it is recommended that concentrate is either:

- ✓ Batch mixed before loading into dip tank, or
- ✓ A proportioner used to meter concentrate into supply line.

Select an area that has an adequate supply of water.

- ✓ Local water source, lake, creek, river, reservoir
- ✓ Hydrant
- ✓ Water tenders

Road access is not required since all needed components can be flown into a remote site and set up in an open area that has a good water source near the fire.

# BLAZETAMER380™ DIP TANK OPERATIONS



Concentrate can be poured or injected directly into batch tank



*Water tenders supporting dip tank operation in California*

**Water Tenders can be used to support helicopter dip tank operations**

- ✓ **Mix and blend before loading into helicopter dip tanks**



*Injecting BLAZETAMER380™ directly into a water tender for batch mixing*

# BLAZETAMER380™ DIP TANK OPERATIONS



*Helicopter dip tank operation with rinse tank*

## HELICOPTER DIP TANKS

- ✓ Bucket Operations - 6,000-10,000-gallon hard-sided dip tank
- ✓ Snorkel Operations - 3,000-6,000-gallon hard or soft-sided tank
- ✓ Additional tanks / pumpkins, as needed, to temporarily store water or blended product until needed in dip tank
- ✓ The number of additional tanks depends on number and size of helicopters, volume and timing of product needs.
- ✓ An additional dip tank is used as a rinse tank for helicopter buckets and fixed tanks.

# BLAZETAMER380™ DIP TANK OPERATIONS



*Batch mixing BLAZETAMER380™  
and pumping to dip tank*

## HELICOPTER DIP TANK OPERATIONS - EQUIPMENT

- ✓ 2-3 Water pumps - 250-550 gpm volume pumps
  - Water to mixing tank with suction hose
  - BLAZETAMER380 from mixing tank to dip tank
  - Additional pump(s) for moving blended product to temporary tanks or recirculation
- ✓ 3" hose from pump to injection system and to dip tank
- ✓ Proportioner / Injection system
- ✓ Miscellaneous camlock fittings and valves

# BLAZETAMER380™ DIP TANK OPERATIONS



## HELICOPTER DIP TANK OPERATIONS – TIPS

- ✓ Monitor fire activity, plans and resources to keep ahead of expected use.
- ✓ Allow blended product to purposely run low at the end of the day so fresh product can be mixed and loaded into dip tank prior to operations the next day.
- ✓ Check mixed product each morning and recirculate for 1-3 minutes if needed to maintain consistency.
- ✓ Do not over-blend as product may become more viscous with aggressive or over-blending.

# BLAZETAMER380™ ON-BOARD INJECTION OPERATIONS



**On-Board Injection & Blending of Liquid Concentrate, BLAZETAMER380™**

**Open the Door to New Possibilities**

# BLAZETAMER380™ ON-BOARD INJECTION OPERATIONS



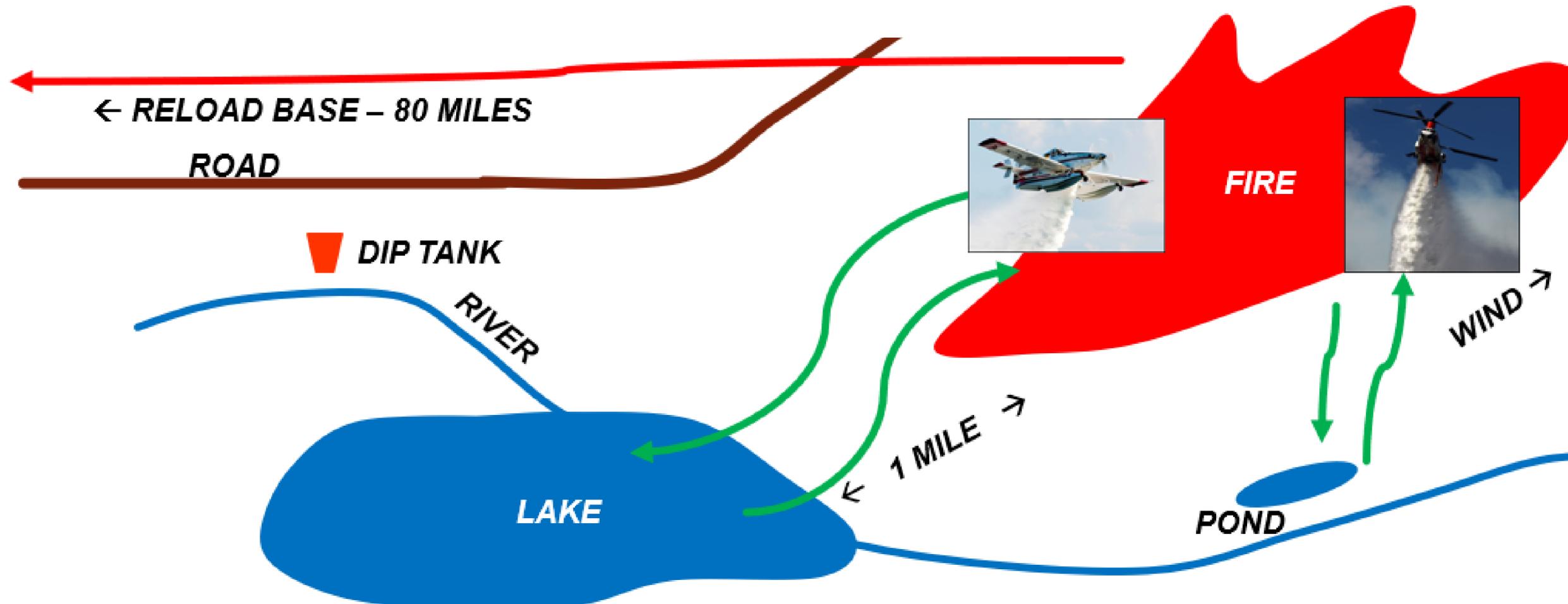
- ✓ Proportioning systems can be either ground-based or can be located in aircraft as a component of on-board systems.
- ✓ Onboard systems have been used for decades for injecting foam concentrate.
- ✓ These systems have been approved for BLAZETAMER380™ by equipment manufacturers, including Kawak, Simplex (DART), Isolair, Helitak and AirTractor with additional manufacturers currently in the design-test-approval-build phase.

# BLAZETAMER380™ ON-BOARD INJECTION OPERATIONS



- ✓ The use of on-board injection allows aircraft to efficiently deliver thousands of gallons of enhanced water to fires each fuel cycle since they do not need to ferry to and from ground bases for reloading.
- ✓ Less time spent ferrying to/from a reload base allows more time per fuel cycle for delivering suppressant to ground firefighters.
- ✓ Less pilot fatigue since pilots remain within the FTA and are able to maintain situational awareness and monitor fire activity

# BLAZETAMER380™ ON-BOARD INJECTION OPERATIONS



- ❖ **Reduce expensive ferry time to/from reload bases or mobile retardant plants with helicopter dip tanks**
- ❖ **Eliminate costs for remote reload bases that require time & logistical support**

# BLAZETAMER380™ ON-BOARD INJECTION OPERATIONS



On-board systems use high-tech, computerized electronics and sensors to calibrate mix ratios and document each load



TROTTER CONTROLS – DATA VAULT SYSTEM

### Mission Summary

Engine	On 1430	2.25h
	Off 1645	
4 Flights, total time	2.00h	
23 Drops, total gals	17385	

next

### Flight #1

Take off	1440	1.00h
Landing	1540	
2 Drops, total gals	1543	

prev

# BLAZETAMER380™ ON-BOARD INJECTION OPERATIONS



- ✓ Multiple operators of firefighting aircraft own and have operated these systems for foam for decades.
- ✓ Modifications to injection systems are not required.
- ✓ A method to provide agitation in the tank is the only item that may need to be incorporated.
- ✓ Concentrate hoppers, pumps and hoses simply need to be clean and dry before introducing BLAZETAMER380™.

# BLAZETAMER380™ ON-BOARD INJECTION OPERATIONS



- ✓ BLAZETAMER380™ blends readily with all types of water and water temperatures. This is important since multiple sources of water may be used with on-board injection operations and it would be impossible to test and evaluate water from multiple sources during active operations on a wildfire.
- ✓ BLAZETAMER380™ does not require shearing and blends properly with mild to moderate agitation.
- ✓ The key to effective on-board systems is the capability for the equipment to properly inject and blend BLAZETAMER380™ in a timely manner, so the product is ready to be dropped within minutes after water is loaded from a remote water source.

# BLAZETAMER380™ ON-BOARD INJECTION OPERATIONS



*FastCart (FC-52) transfers 52 gallons to FireBoss*

**BLAZETAMER380™ is an excellent candidate for on-board injection and increased use in aircraft.**

- ✓ BLAZETAMER380™ has desirable drop characteristics and suppression properties, is able to penetrate canopies, is easy to mix and handle, has passed all toxicity and corrosion tests and is approved by manufacturers of on-board injection systems.
- ✓ Concentrate is transferred to aircraft using a simple tank and pump system either available through BLAZETAMER USA or fabricated by vendors.

# BLAZETAMER380™ ON-BOARD INJECTION OPERATIONS



Similar systems can be designed for  
LATs & VLATs

## SEAT OPERATIONS

- ✓ Concentrate from the 18-gallon “rinse tank” is injected into the water tank then loaded with water at a SEAT Base or other airport/airstrip that has a water source (fire department or hydrant).
- ✓ The action within the tank as it is filled with water provides adequate agitation for mixing.
- ✓ Concentrate in the 18-gallon tank (standard on AT-802) will provide enough concentrate for 3-7 loads, depending on mix ratio

# BLAZETAMER380™ ON-BOARD INJECTION OPERATIONS



## FIREBOSS OPERATIONS

Approved on-board systems have from 48 to 78-gallon capacity and can provide enough concentrate for 16-20+ loads, depending on the mix ratio, desired fuel load and payload.

# BLAZETAMER380™ ON-BOARD INJECTION OPERATIONS



## CL-215T / CL-415 OPERATIONS

- ✓ Currently approved for ground-loading only of BLAZETAMER380™ by the aircraft manufacturer, Viking Air, in the CL-215 / CL-215T / CL-415 fleet.
- ✓ Test drops in Canada have proven that BLAZETAMER380™ is a viable alternative to foam in these aircraft since it is more environmentally friendly, efficient and effective.
- ✓ Viking Air is waiting for user agencies to request the current foam system is redesigned to accommodate liquid concentrate water enhancers, such as BLAZETAMER380™, before they commit to engineering a system.
- ✓ BLAZETAMER USA is confident that a system similar to the one available in the FireBoss will work extremely well.



CL-415 dropping BLAZETAMER380™ in Ontario

# BLAZETAMER380™ ON-BOARD INJECTION OPERATIONS



## HELICOPTERS with TANKS

- ✓ BLAZETAMER380™ is approved for use in Simplex, Isolair, KAWAK and Helitak tank systems.
- ✓ Concentrate reservoirs are sized to provide 20+ loads per fuel cycle at a mix rate of 0.2% - 0.32%.

# BLAZETAMER380™ ON-BOARD INJECTION OPERATIONS



*On-board injection in bucket on Florida Forest Service UH-1H*

## HELICOPTERS with BUCKETS

- ✓ BLAZETAMER380™ is approved for use in the SEI Sacksafoam system for Bambi Buckets.
- ✓ Concentrate tanks can be a bladder in the bucket or installed inside the aircraft with concentrate injected through a hose to the bucket.
- ✓ A new system that includes a controller & bladder with dosing and agitation pump attached will soon be available

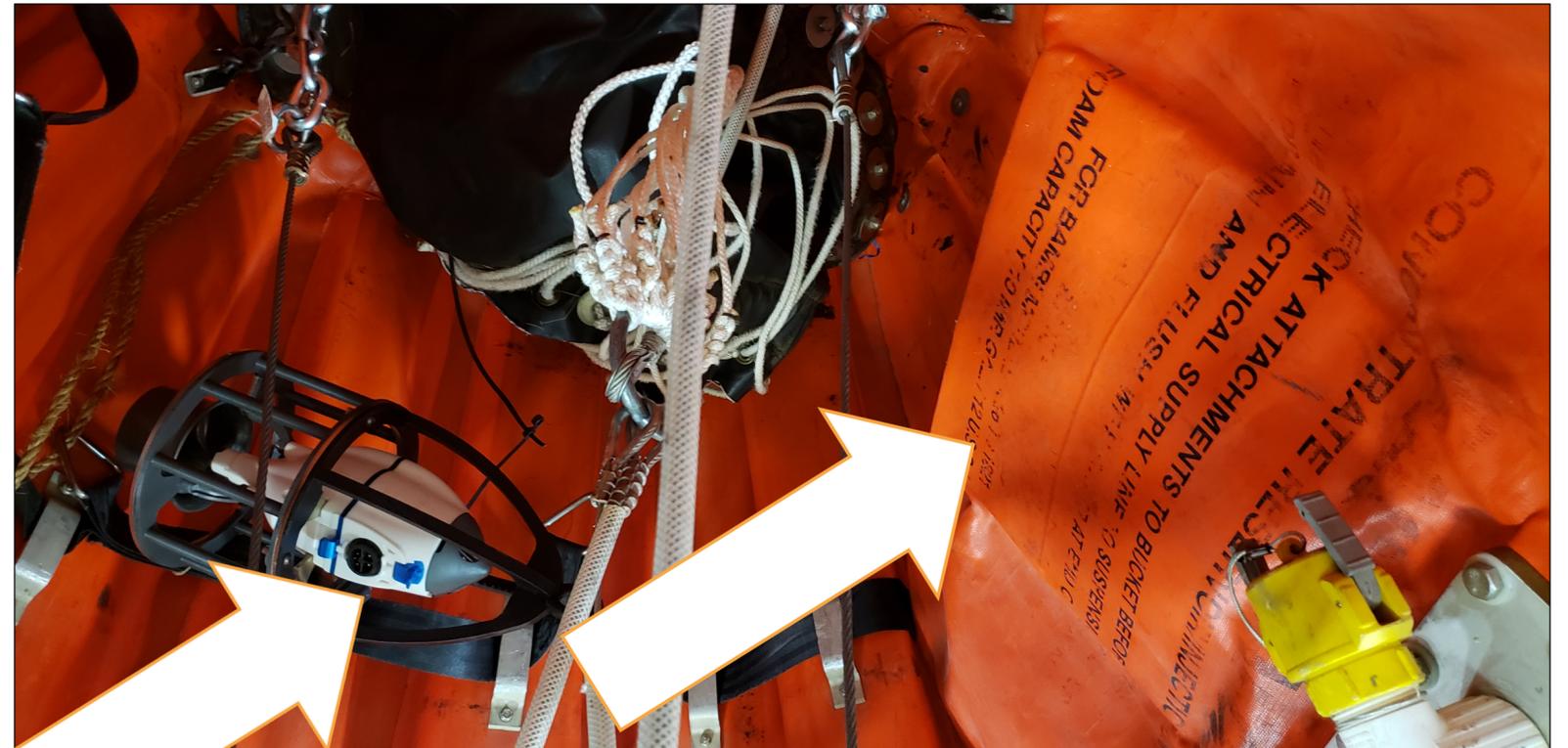
# BLAZETAMER380™ ON-BOARD INJECTION OPERATIONS



CONCENTRATE CONTAINER CAN BE IN HELICOPTER OR BLADDER IN BUCKET



*Internal or External Tank on Helicopter*



*Bladder Inside Bucket*

*Agitation Pump*

# BLAZETAMER380™ ON-BOARD INJECTION OPERATIONS



**1. Load Water in Bucket**



**2. Inject BLAZETAMER380**

**Adequate blending achieved within 1 minute**



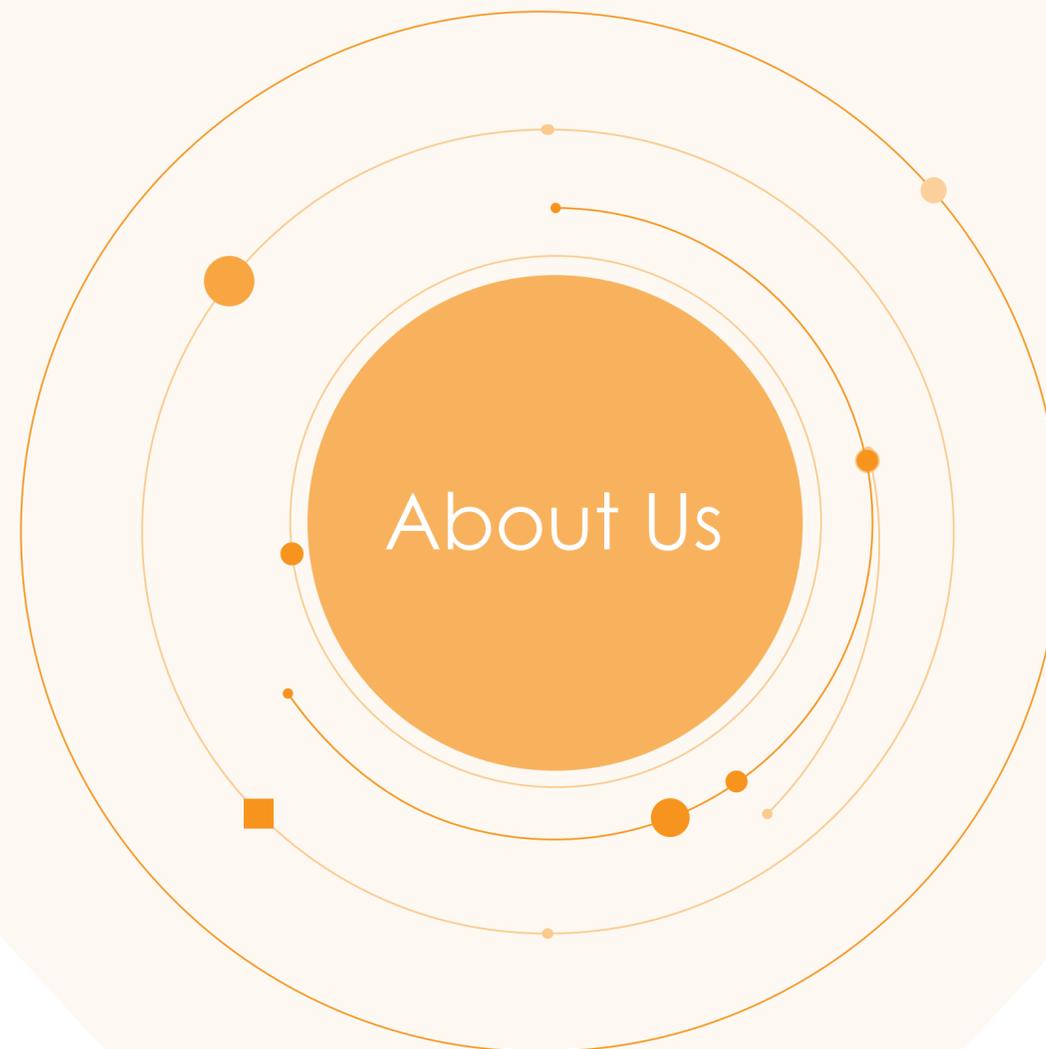
**3. Agitate with pump located in bucket**



**We have described how to easily BLAZETAMER380™ can be incorporated into several types of firefighting operations.**

**To learn more about how BLAZETAMER380™ can fit into your specific fire suppression program, please contact BLAZETAMER USA.**

**Our team will share our expertise and knowledge to integrate BLAZETAMER380™ in a cost effective manner. We provide on-site equipment evaluations and training for our customers.**



## About Us

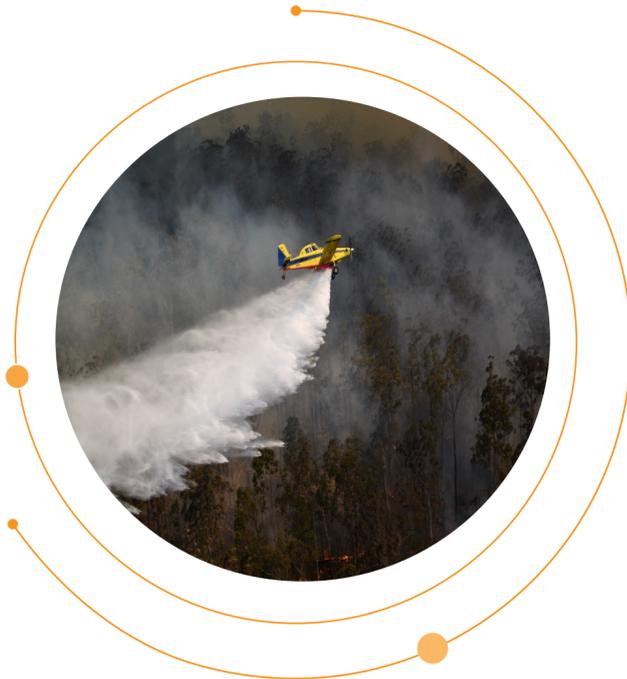
### Mission

**We enhance water to provide a non-toxic, environmentally responsible fire suppressant to advance the firefighting industry.**

### Vision

**Enhancing water to save lives and protect our environment.**

# OUR BRANDS:



BLAZETAMER380™ is an elastomer used for increasing the efficiency of water for the direct attack of class A fire suppression. It is the first polymeric elastomer of its type in the world, to be listed on the USDA-FS qualified products listing (QPL).



AquaBoostAG is a patented polymer solution which increases irrigation and fertiliser efficiency by altering soil hydraulics, slowing the infiltration of moisture through the soil profile, promoting lateral spread and maintaining water and nutrients in the root zone for a longer period.



Polycom is a road base materials stabilisation agent. When mixed with the water on site it delivers a longer lasting running surface. Roads treated with PolyCom have lasted up to four times longer before requiring the regular maintenance programs as scheduled. This contributes significantly to long term asset management plans.



DustChek is a new generation dust control product specifically formulated for today's challenging dust control problems in the mining industry. DustChek improves and stabilises unpaved haul road surfaces by saturating and bonding dust and aggregate particles together.

# THANK YOU

Training Module 8 –  
HOW TO OBTAIN  
BLAZETAMER380