

## **Wildland Fire Chemicals Tactics and Product Characteristics Aerial Application**

### **Why are wildland fire chemicals used?**

- They chemically treat fuels to make them less combustible (long-term retardant)
- They maximize available water supply (foam and water enhancer/gel)
- They improve efficiency of water (foam and water enhancer/gel)
- They reduce fire intensities (retardant, foam and water enhancer)

### **What kinds of chemicals can be used?**

- Only chemicals that are on the Qualified Products List (QPL) shall be used, and only for the delivery method approved. See website for details: <http://www.fs.fed.us/rm/fire/wfcs/index.htm>

### **What kinds of products are available?**

- **Suppressants (direct attack only):**
  - **Foam fire suppressants** contain foaming and wetting agents. The foaming agents and percentage concentrate added affect the accuracy of an aerial drop, how fast the water drains from the foam, and how well the product clings to the fuel surfaces. The wetting agents increase the ability of the drained water to penetrate fuels. These products are dependent on the water they contain to suppress the fire. Once the water they contain has evaporated, they are no longer effective.
  - **Water enhancers** contain ingredients designed to alter the physical characteristics of water to increase effectiveness, accuracy of the drop, or adhesion to fuels. They also improve the ability of water to cling to vertical and smooth surfaces. The consistency of these products can change depending on the quality of the water used for mixing. Once the water they contain has evaporated, they are no longer effective.
- **Long-term retardants (direct and indirect attack):**  
Contain retardant salts (typically fertilizers) that alter the way the fire burns, decreasing the fire intensity and slowing the advance of the fire, even after the water in the mix has evaporated.

## **Personal and Environmental**

### **Health/Environmental:**

- Approved fire chemical products have been tested and meet specific minimum requirements with regard to mammalian and aquatic toxicity
- The field is required to report known accidents, spills, and exceptions to the Guidelines for Aerial Delivery of Retardant or Foam near waterways (any body of water including lakes, rivers, streams and ponds whether or not they contain aquatic life) and other avoidance areas and follow the Interagency Policy for Aerial and Ground Delivery of Wildland Fire Chemical Near Waterways and Other Avoidance Areas ([http://www.fs.fed.us/fire/retardant/interagency\\_policy\\_aerial\\_delivery.pdf](http://www.fs.fed.us/fire/retardant/interagency_policy_aerial_delivery.pdf)) and the Chief of the Forest Service Record of Decision (2011).
- Aerial operations, especially dipping, snorkeling and scooping operations, have a high potential for spreading invasive species. Consult with Incident Resource Advisor on areas of exceptional concern, and avoid transferring water from one source to another.

### **Do's:**

- Follow manufacturer's recommendations as found on product label and MSDS
- **PPE:** Wear eye protection and waterproof gloves when mixing
- Have eye wash capability and first aid kit available at mixing sites
- Be cautious of slippery conditions in work area
- Rinse exposed skin, clothing and equipment thoroughly with water after use
- Apply spill containment procedures in accordance with Agency policy
- Follow ICS and/or Agency Chain of Command process for reporting of all spills and/or applications in 300' buffer zone, waterways and mapped avoidance areas for threatened, endangered, proposed, candidate or sensitive species (TEPCS)

- Reporting forms, tools and more information is available at:  
<http://www.fs.fed.us/fire/retardant/index.html>.

**Don'ts:**

- Don't inhale vapors or dust when mixing (wear dust mask around dry retardant)
- Don't eat or drink when working with chemicals
- Don't mix, stage or apply chemicals in or near waterways (all wildland fire chemicals must remain outside of the 300' buffer zone) Additional avoidance areas may exist beyond the 300' buffer zone or in upland locations, contact the Resource Advisor for these local mapped areas.
- Don't dispose of unused chemicals without Incident Resource Advisor approval

## **Aerial Equipment Basics**

**How long can I expect products to remain effective after application?**

- Long-Term Retardants – Days to Weeks (or until removed by rain or wind)
- Foams – Minutes
- Water Enhancers/Gels - Minutes to Hours (direct sunlight breaks down gels faster)

**Are there issues with mixing products?**

- **Never mix retardant with foam or gel!** Even residual retardant can break down an entire batch of foam or gel.
- **Do not mix different foams or different gels:** Many products are incompatible with each other.

**Equipment considerations:**

- Large Air Tankers, Very Large Airtankers (VLATs), SEATs, Helicopter fixed tanks and buckets: All accept batch-mixed product, some SEATs and helicopter fixed tanks and buckets have foam injection capabilities
- Consult QPL for product compatibility

***Note: most products have specific uses and may not be approved for all drop systems. See QPL and website noted above. Products must have received approval for the type of equipment that will be used.***

**Official Duties:**

- Typically, aerial operations involve contractor support. Refer to the appropriate retardant contract for explanation of Government and Contractor responsibilities.

**Equipment care:**

- Rinse tanks, tankers and buckets after every use or at the end of each day, to minimize rust and other corrosion
  - Helicopter fixed tanks and buckets delivering retardant should draft from a dip tank of clean water at the end of the day to thoroughly rinse exposed components
- Lubricate equipment often
- Foam concentrate in a sealed system (not exposed to air) can generally be left alone during use season, but flush before storage
- Water enhancers can be tenacious; rinse very thoroughly to remove all residues.

***Note: All rinse water should be handled like it is contaminated. Contain and dispose of properly!***