



ThunderStorm® ATC AR-AFFF

1% or 3% FC-601A



Technical Information

Description

ThunderStorm® FC-601A 1% or 3% ATC AR-AFFF concentrate is formulated using a new and proprietary technology. The foam concentrate has a dramatically reduced viscosity as compared to other 1% or 3% listed polar solvent type AFFF concentrates on the market. This reduced viscosity enhances performance in all types of foam proportioning equipment including in-line eductors, balanced pressure systems, and built-in systems aboard CFR vehicles.

Additionally, the fire fighting performance of ThunderStorm® FC-601A is superior to other AR-AFFF foam concentrates. This includes the blended gasoline additive Methyl Tertiary Butyl Ether (MTBE) which is being used as an oxygenate to make gasoline cleaner burning. ThunderStorm® FC-601A concentrate offers many distinct advantages for ease of use and represents a continued commitment to quality by improving the fire performance of this type of agent on gasoline products while still maintaining high performance levels on other hydrocarbons and polar fuels.

ThunderStorm® FC-601A concentrate is formulated from special fluorochemical and hydrocarbon surfactants, high molecular weight polymers and solvents. It is transported and stored as a concentrate to provide ease of use and considerable savings in weight and volume. It contains no PFOS or PFOA ingredients. It is intended for use as a 1% proportioned

solution on hydrocarbon fuels and as a 3% proportioned solution on polar fuels in fresh, salt or hard water. It may also be stored and used as a premixed solution in fresh potable water only. ThunderStorm® FC-601A concentrate is biodegradable.

There are three fire extinguishing mechanisms in effect when using ThunderStorm® FC-601A solution on either a conventional Class B hydrocarbon fuel such as gasoline, diesel fuel, etc., or a Class B polar solvent (water miscible fuel) such as methyl alcohol, acetone, etc. First, an aqueous film is formed in the case of a conventional hydrocarbon fuel, or a polymeric membrane in the case of a polar solvent fuel. This film or membrane forms a barrier to help prevent the release of fuel vapor. Second, regardless of the fuel type, a foam blanket is formed which excludes oxygen and from which drains the liquids that form the film or the polymeric membrane. Third, the water content of the foam produces a cooling effect.

Typical Physiochemical Properties at 77°F/25°C

Appearance	Gelled Liquid
Density	1.02 - 1.05 g/ml
pH	7.0 – 8.5
Refractive Index	1.3580 min.
Typical Viscosity	2000 CPS*
Spreading Coefficient	4.0 – 6.0

*Brookfield #4 Spindle at 30 rpm

ThunderStorm® FC-601A 1% or 3% ATC AR-AFFF concentrate is a non-Newtonian fluid that is both pseudoplastic and thixotropic. Because of these properties, dynamic viscosity will decrease as shear increases.

Application

ThunderStorm® FC-601A can be used on either conventional Class B fuel or the polar solvent type Class B fuels. Its excellent wetting characteristics make it useful in combating Class A fires as well. Because of the low energy required to make foam, it can be used with both aspirating and non-aspirating discharge devices. To provide even greater fire protection capability, it may be used with "PKW™" dry chemical extinguishing agent without regard to the order of application. Hydro-Chem™ Technology is a recommended application for dual agent use on three dimensional fire. Due to the velocity of the dry chemical discharge, care must be taken not to submerge the polymeric membrane below the fuel surface when using twin agents on polar fuels.

Fire Performance

The fire performance of ThunderStorm® FC-601A is measured primarily against Underwriters Laboratories Standard 162 (Latest Revision) and Williams Fire and Hazard Control's fire test. The UL testing focuses on fuels such as heptane and isopropyl alcohol while the Williams Fire and Hazard Control test focuses on premium unleaded gasoline. ThunderStorm® FC-601A was formulated to provide superior performance on all fire tests, especially important is performance on high octane gasoline.

Foam Properties

When used with fresh, salt or hard water at the correct dilution with most conventional foam making equipment, the expansion will vary depending on the performance characteristics of the equipment. Aspirating discharge devices produce expansion ratios of 5:1 to 10:1 depending primarily on type of aspirating device and flow rate. Non-aspirating devices such as handline water fog/stream nozzles or standard sprinkler heads give expansion ratios of 2:1 to 4:1. Medium expansion discharge devices produce typical expansion ratios between 20:1 to 60:1 depending primarily upon type of device and operating conditions.

Proportioning

ThunderStorm® FC-601A can be easily proportioned (at the correct dilution) using most conventional proportioning equipment such as:

- Hydro-Foam™ Nozzles
- Balanced pressure and in-line balanced pressure pump proportioning equipment
- Balanced pressure bladder tank proportioner
- Around-the-pump and Through-the-pump proportioners
- Fixed or portable (in-line) venturi proportioners
- Handline nozzles with fixed induction/ pickup tubes

The minimum and maximum usable temperature for ThunderStorm® FC-601A in this equipment is 35 °F (2 °C) to 120 °F (49 °C) respectively.

Storage/Shelf Life

When stored in the packaging supplied (polyethylene totes, drums or pails) and within the temperature ThunderStorm® FC-601A limits specified, the shelf life of ThunderStorm® FC-601A is about 20-25 years. Freezing of the product should be avoided. If, however, the product is frozen during transport or storage, it must be thawed and inspected for signs of separation. If separation has occurred, the product must be mechanically mixed until homogeneous. When the concentrate is to be stored in an atmospheric storage tank, a .125 to .25 in. (3 – 6 mm) layer of mineral oil should be added to seal the concentrate and minimize the effects of evaporation



Compatibility

Since ThunderStorm® FC-601A is a unique blend of surfactants, high molecular weight polymers, and solvents; it is recommended that it not be mixed with any other foam concentrates. Consult Williams Fire and Hazard Control with any questions of compatibility.

Materials of Construction

Compatibility

Tests have been performed with ThunderStorm® FC-601A verifying its compatibility with standard carbon steel "black" pipe and pipe manufactured from various stainless steel or brass compounds. Alternative pipe, plastic fittings, and valves may be used in some cases if acceptable to the customer and/or the authority having jurisdiction.

Galvanized pipe and fittings must not be used in areas where undiluted concentrate will contact them since corrosion will result.

Please first consult Williams Fire and Hazard Control for specific guidelines concerning materials of construction.

Inspection

As with any fire extinguishing agent, ThunderStorm® FC-601A, whether in the concentrate or premixed form, should be inspected periodically. NFPA 11 "Standard for Low Expansion Foam and Combined Agent Systems" requires that foam concentrate samples be submitted to the manufacturer or other qualified laboratory for quality condition testing at least annually.

Contact Williams Fire and Hazard Control for further information on annual inspection.

Approvals and Listings

Underwriters Laboratories successfully tested ThunderStorm® FC-601A to the requirements contained in U.L. Standard 162, "Standard for Air-Foam Equipment and Liquid Concentrates." To receive a U.L. listing, the following tests had to be performed successfully:

- Foam Quality Tests
- Class B Hydrocarbon Fuel Fire Tests
- Class B Polar Solvent Fuel Fire Tests
- Foam Identification Tests
- Tests of Shipping Containers



FC-601A is currently UL Listed. The UL Listed Application rate for Hydrocarbons is 0.10 gpm/sq. ft. The UL Listed Application rate for Alcohols is 0.13 gpm/sq. ft.

In addition to determining agent characteristics, Underwriters Laboratories lists ThunderStorm® FC-601A concentrate for use with specific hardware components that also carry the U.L. listing.

Ordering Information

ThunderStorm® FC-601A is available in pails, drums, totes or bulk shipment.

5 gallon pail	Part No. FC601AP
55 gallon drum	Part No. FC601AD
265 gallon tote	Part No. FC601A265T
Bulk Delivery	Part No. FC601AG

Shipping Weight

5 gal. (19 L) pail	45 lbs. (20.4 kg)
55 gal. (208.2 L) drum	495 lbs. (224.5 kg)
265 gal. (1000 L) tote	2463 lbs. (1117 kg)
Cube: 5 gal. (19 L) pail	1.25 cu. ft. (.0354 m3)
55 gal. (208.2 L) drum	11.83 cu. ft. (.3350 m3)
265 gal. (1000 L) tote	31.50 cu. ft. (.8920 m3)

Environmental Impact

FC-601A is biodegradable, low in toxicity and can be treated in sewage treatment plants.

Important Notice to Purchaser

All statements, technical information and recommendations contained herein are based on tests conducted with ThunderStorm® FC-601A approved equipment, and are believed to be reliable. But the accuracy or completeness thereof is not guaranteed, and the following is made in lieu of all warranties, expressed or implied, including the implied warranties of merchantability and fitness for purpose:

Sellers and manufacturer's only obligation shall be to replace such quantity of the product proved to be defective. Before using, user shall determine the suitability of the product for its intended use, and user assumes all risk and liability whatsoever in connection there within. NEITHER SELLER NOR MANUFACTURER SHALL BE LIABLE EITHER IN TORT OR IN CONTRACT FOR ANY LOSS OR DAMAGE, DIRECT, INCIDENTAL, OR COINCIDENTAL, ARISING OUT OF THE USE OF OR THE INABILITY TO USE THE PRODUCT. No statement or recommendation not contained herein shall have any force or effect unless in an agreement signed by officers of seller and manufacturer.



Williams Fire & Hazard Control, Inc.
Mauriceville, Texas, USA 77626
P.O. Box 1359
24 Hour Emergency Number — 409-727-2347



MATERIAL SAFETY DATA SHEET

Date Prepared: 3/26/2010

Supersedes Date: New

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: **Thunderstorm FC-601A**

Chemical Family: Surfactant mixture, fire fighting foam concentrate, aqueous film forming foam.

Company Identification: Chemguard, Inc.
 204 South 6th Avenue
 Mansfield, Texas 76063 USA
 (817) 473-9964 (For Product Information)
 (817) 473-9964 (For Emergency Information)
www.chemguard.com

2. COMPOSITION / INFORMATION ON INGREDIENTS

CONTAINING: HAZARDOUS AND/OR REGULATED COMPONENTS

<u>Chemical Name</u>	<u>Percentage</u>	<u>CAS Number</u>	<u>OSHA Hazard</u>
Water	Balance	7732-18-5	NO
Diethylene glycol monobutyl ether	4 - 13 %	112-34-5	YES
Polysaccharide gum	1 - 2 %	Proprietary	YES
Proprietary hydrocarbon surfactants	NA	Proprietary	YES
Proprietary fluorosurfactants	NA	Proprietary	YES

COMPOSITION NOTES:

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW **WARNING! MAY CAUSE EYE AND/OR SKIN IRRITATION**

Routes of Exposure:

Eye Contact: Exposure during the handling or mixing may cause immediate or delayed irritation or inflammation.

Skin Contact: Exposure during the handling or mixing may cause immediate or delayed irritation or inflammation.

Ingestion: Ingestion of large quantities may cause abdominal cramps, nausea, vomiting, diarrhea.

Inhalation: Exposure to this product in excess of the applicable TVL or PEL may cause or aggravate other lung conditions. Exposure to this product may cause irritation to the nose, throat, and upper respiratory system.

Chronic: None known

Medical Conditions which May be Aggravated by Inhalation or Dermal Exposure: Persons with unusual (hyper) sensitivity to chemicals may experience adverse reactions to this product.

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Carcinogenic Potential: This product and its ingredients are not listed as a carcinogen by NTP, OSHA, ACGIH or IARC.

4. FIRST AID MEASURES

Eyes: Immediately flush eyes thoroughly with water. Continue flushing eye for at least 15 minutes, including under lids. Seek immediate medical attention.

Skin: In case of contact, immediately wash with plenty of soap and water for at least 5 minutes. Seek medical attention if irritation or redness occurs. Remove contaminated clothing and shoes. Clean contaminated clothing and shoes before re-use.

Ingestion: If victim is conscious and alert, give 2 – 3 glasses of water to drink. Do not induce vomiting without medical advice. Do not induce vomiting or give anything by mouth to an unconscious person. Seek immediate medical attention. Do not leave victim unattended. Vomiting may occur spontaneously. To prevent aspiration of swallowed product, lay victim on side with head lower than waist. If vomiting occurs and the victim is conscious, give water to further dilute the chemical.

Inhalation: If respiratory irritation or distress occurs remove victim to fresh air. Seek medical attention if respiratory irritation or distress continues. If breathing is difficult, give oxygen. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

Notes to Physician: All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

5. FIRE FIGHTING MEASURES

Flash Point – No flash to boiling

Lower Explosive Limit – Not Applicable

Upper Explosive Limit – Not Applicable

Hazardous Combustion Products – None known

Unusual Fire & Explosion Hazards – Decomposition products may be toxic.

Extinguishing Media – Water, Foam, Carbon Dioxide, Dry Chemical, Halon

Special fire fighting Procedures – None

Auto Ignition Temperature – Not Applicable

6. ACCIDENTAL RELEASE MEASURES

Wear appropriate protective gear for the situation. See Personal Protection information in section 8.

Containment of Spill: Dike or retain dilution water or water from firefighting for later disposal. Follow procedure described below under cleanup and disposal of spills.

Cleanup and Disposal of Spill: Vacuum or pump into an appropriate storage container. For smaller spills use absorbent materials and dispose of properly. Washing area with water will create large amounts of foam.

Environmental and Regulatory Reporting: Runoff from fire control or dilution water may cause pollution. Spills may be reportable to the National Response Center (800-424-8802) and to state and/or local agencies.

7. HANDLING AND STORAGE

Minimum/Maximum Storage Temperature: Store at temperatures of 35°F - 120°F.

Handling: Use with adequate ventilation.

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Storage: Store in an area that is dry, well ventilated and in closed containers.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls: Where engineering controls are indicated by use conditions or a potential for excessive exposure exists, the following traditional exposure techniques may be used to effectively minimize employee exposures.

Eye Protection: When engaged in activities where product could contact the eye, wear safety glasses with side shields, goggles, or face shield.

Skin Protection: Skin contact should be minimized through use of latex gloves and suitable long sleeved clothing. Consideration must be given both to durability as well as permeation resistance.

Respiratory Protection: Avoid actions that cause dust exposure to occur. Use local or general ventilation to control exposures below applicable exposure limits. NIOSH or MSHA approved particulate filter respirators should be used in the context of respiratory protection program meeting the requirements of the OSHA respiratory protection standard [29 CFR 1910.134] to control exposures when ventilation or other controls are inadequate or discomfort or irritation is experienced. Respirator and/or filter cartridge selection should be based on American National Standards Institute (ANSI) Standards Z88.2 Practices for Respiratory Protection.

Ventilation: Use local exhaust or general dilution ventilation to control exposure within applicable limits.

Work Practice Controls:

Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material:

- (1) Do not store, use, and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored.
- (2) Wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics, or using the toilet.
- (3) Wash exposed skin promptly to remove accidental splashes or contact with this material.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance – Thick liquid

Odor – Very slight solvent odor

Physical State – Liquid

Specific Gravity (H₂O=1) – 1.021 – 1.051

pH 7.0 – 8.5

Vapor Pressure – Not Evaluated

Density – Not Evaluated

Boiling Point – 212°F

Melting Point – 32°F

Solubility in Water – 100% Soluble

10. STABILITY AND REACTIVITY

Stability: Stable.

Conditions to avoid: Unintentional contact with water.

Hazardous Polymerization: Hazardous polymerization will not occur.

Incompatibility with other materials: Strong oxidizers

Hazardous Decomposition: Oxides of nitrogen, sulfur, carbon.

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11. TOXICOLOGICAL INFORMATION

Acute Eye and Skin Toxicity Data:

Toxicological Information and Interpretation:

	<u>Concentration</u>	<u>Solution (As Used)</u>
Eye Irritation:	Not evaluated	Not evaluated
Skin Irritation:	Not evaluated	Not evaluated
Acute Dermal LD50		
Acute Oral Effects:		
Acute Oral LD50		
Inhalation Toxicity:	Not evaluated	
Sensitization:	Not evaluated	
Teratology:	Not evaluated	
Mutagenicity:	Not evaluated	
Reproduction:	Not evaluated	

Chronic Toxicity:

This product does not contain any substances that are considered by OSHA, NTP, IARC or ACGIH to be "probable" or "suspected" human carcinogens.

12. ECOLOGICAL INFORMATION

Chemical Oxygen Demand: 304,000 mg/kg
Biological Oxygen Demand (5 Day) 141,000 mg/kg
Biodegradability (B.O.D./C.O.D.) 46%

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Chemical additions, processing or otherwise altering this material may make the waste management information presented in this MSDS incomplete, inaccurate or otherwise inappropriate. Dispose of waste material according to local, state and federal regulations. Discharge to waste treatment facilities only with permission. Anti-foam agents may be used to reduce foaming in the waste streams. Do not incinerate.

14. TRANSPORTATION INFORMATION

Hazardous Materials Description/Proper Shipping Name: NOT REGULATED

Hazard Class: Not Applicable

Identification Number: Not Applicable

Required Label Text: Not Applicable

Hazardous Substances/Reportable Quantities: Not Applicable

15. REGULATORY INFORMATION

FEDERAL REGULATORY STATUS:

Status under OSHA Hazard Communication Standard, 29 CFR 1910.1200: This product is considered a

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"hazardous chemical" under this regulation, and does not need to be included in the employer's hazard communication program.

Reportable Quantities Under the Clean Water Act, CERCLA, and EPCRA, 40 CFR 117, 302 and 355:

The product contains no component regulated under section 304 (40 CFR 370).

Hazard Category and Applicability of EPCRA Hazardous Substance Inventory Reporting, 40 CFR 370:

Not listed

Applicability of EPCRA Toxic Chemical Release Inventory (TRI) Reporting, 40 CFR 372:

Not subject to TRI reporting

Status Under the Toxic Substances Control Act, 40 CFR 710:

All chemical(s) comprising this product are either exempt or listed on the TSCA Inventory.

SARA Title III Hazard Classes:

Fire Hazard: NO
Reactive Hazard: NO
Release of Pressure: NO
Acute Health Hazard: YES
Chronic Health Hazard: NO

State Regulations:

California:

This product does not contain any components that are regulated under California Proposition 65.

Pennsylvania:

This product does not contain any components on the Pennsylvania Right to Know List.

16. OTHER INFORMATION

NFPA Ratings: Health: 1 Flammability: 0 Reactivity: 0

Label Requirements:

WARNING! MAY CAUSE EYE AND/OR SKIN IRRITATION

Hazardous Material Information System (HMIS):	Health	1
	Flammability	0
	Reactivity	0
	Personal Protection	A

NFPA/HMIS Definitions: 0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme

Protective Equipment: Safety glasses, gloves

ADDITIONAL INFORMATION:

The information contained in this document is given in good faith and based on our current knowledge.

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It is only an indication and is in no way binding, notably as regards infringement of, or prejudice to third parties through the use of our products. Chemguard guarantees that its products comply with its sales specifications. This information must on no account be used as a substitute for necessary prior tests which alone can ensure that a product is suitable for a given use. Users are responsible for ensuring compliance with local legislation and for obtaining the necessary certifications and authorizations.

END OF MSDS