



## Foam Terminology

**Absorption:** The act of absorbing or being absorbed.

**AFFF (Aqueous Film Forming Foam):** A foam concentrate containing fluorochemical surfactants that control the physical properties of water enabling it to float and spread across the surface of the hydrocarbon liquid.

**AFFF - Polar (AR-AFFF):** An AFFF that contains a pseudo plastic material, which forms a polymeric layer only on polar solvents to separate and protect the finished foam.

**Adhesive Qualities:** The ability to bind together substances of unlike composition. When a foam blanket clings to a vertical surface, it is said to have adhesive qualities. This is required to prevent vapor release at a tank shellfire or to describe Class "A" foam application to exposures.

**Airfoam:** Foam produced by the physical agitation of a solution of water and foaming agent and air. Also called mechanical foam.

**ARC - Alcohol Resistant Concentrate:** See AFFF Polar.

**Aspirate:** Draw air into the nozzle to mix with the foam solution.

**Batch Mix:** Manual addition of foam concentrate to a water storage container or to make a foam solution.

**Barrier:** Any physical obstruction that impedes the spread of the fire (typically an area or strip devoid of flammable fuels).

**Biodegradation:** Decomposition by microbial action as with synthetic detergent or protein based agents.

**Boilover:** The violent ejection of flammable liquid from its container caused by the vaporization of water beneath a body of burning hydrocarbon liquid. This may occur after a lengthy burning period of products such as crude oil when the heat wave has passed down through the liquid and reaches the water bottom in the storage tank. This will not occur to any significant degree with water-soluble liquids or light products such as gasoline.

**Bubble:** The building block of foam performance and durability is influenced by water content of the bubble.

**Bund:** An area defined as a contour of land or a physical barrier that retains a fuel to a depth greater than 1". (See Dike).

**Burnback Resistance:** The ability of the finished foam to resist direct flame impingement such as would occur with partially extinguished petroleum fire or with Class "A" foam in exposure protection and pretreatment.

**Carcinogenic:** Cancer causing.

**Class "A" Fire:** A fire in combustibles that exhibit deep seated burning characteristics such as wood, paper, fabric, tires and peat, where the cooling, smothering and soaking ability of Class "A" foam and water are best utilized.

**Class "B" Fire:** A fire involving any type of flammable liquid where blanketing and smothering for vapor suppression is of the first importance.

**Class "C" Fire:** A fire in "live" electrical equipment where the use of non-conducting fire suppression agents is of prime importance.

**Class "D" Fire:** Metal fires, such as magnesium or titanium and usually non-conductive suppressants are used.

**Cohesive Qualities:** The ability to bind together substances of like composition. A good foam blanket is held together by its cohesive qualities.

**Combustible Liquid:** Any liquid having a flash point at or above 100° F (37.8°C).

**Compatibility:** The ability or inability of extinguishing agents to be mixed together or used simultaneously.

**Compressed Air Foam System (CAFS):** A generic term used to describe high-energy foam delivery systems consisting of an air compressor (or air source), a water pump (or pressurized water) and foam injection equipment (or foam solution).

**Concentration:** The amount of foam concentrate contained in a given amount of foam solution. The type of foam used determines the foam concentration. (i.e. AFFF 1%, 3% or 6% and Class A foams from 0.1% up to 1%).

**Corrosion:** Resulting chemical reaction between a metal and its environment, (i.e. air, water and impurities.)

**Degradation:** A negative change in the characteristics of qualities of foam.

**Density:** The weight of a specific volume of solution.

**Dike:** An area defined as a contour of land or a physical barrier that retains a fuel to a depth greater than 1". (See Bund).

**Discharge Device:** A fixed or portable device which directs the flow of solution or finished foam onto the hazard (example: fixed master stream device or an aspirating handline).

**Downstream:** The direction to which the water is flowing.

**Drainage (Dropout) Rate:** The rates at which bubbles from a finished foam blanket burst and release their solution - generally measured as quarter drain time.

**Expansion Ratio:** The ratio of volume of foam formed to the volume of solution used to generate the foam (example: an 8:1 expansion ratio means 800 gallons of finished foam were created from 100 gallons of foam solution). Expansion ratio is determined by the use of different aspiration devices, low energy and high energy delivery.

**Eductor:** A proportioning device which uses the vacuum created by the water moving through a venturi to draw concentrate into the hose line.

**Environment:** The complex surrounding an area such as water, air and natural resources and their physical conditions (temperature, humidity, etc.).

**Film Forming Fluoroprotein - FFFP:** A foam concentrate composed of protein and film forming fluorinated surface-active agents, which makes it capable of forming a water solution film on the surface of a flammable liquid and conferring a fuel shedding property to the finished foam blanket. See also Oleophobic.

**Fluoroprotein Foam - FP:** A foam concentrate composed of protein polymers and fluorinated surface-active agents that confer a fuel shedding property to the finished foam blanket. See Oleophobic.

**Fire Retardant:** Any substance that by its chemical nature or physical action reduces or impedes the flammability of a combustible.

**Flammable Liquid:** A substance that is liquid at ordinary temperatures and pressures and has flash point below 100°F (38°C).

**Flash Back:** Re-ignition of a flammable liquid caused by the exposure of its vapors to a source of ignition such as a hot metal surface or spark.

**Flash Point:** The temperature point at which a flammable liquid gives off enough vapor to ignite.

**Fluorocarbon:** An inert organic compound in which fluorine replaces hydrogen.

**Foam - (Finished):** A homogeneous blanket obtained by mixing water, foam concentrate and the addition of air or an inert gas by the use of energy.

**Foam - (Concentrate):** The foaming agent for mixing in the right proportion with water and air to produce a finished mechanical foam.

**Foam Maker:** A device designed to introduce air into a pressurized foam solution stream (i.e. low/medium expansion nozzle, high expansion nozzle or compressed air foam system.)

**Foam Solution:** A homogeneous mixture of water and foam concentrate.

**Foam Stability:** The relative ability of a finished foam to withstand spontaneous collapse or breakdown from external causes such as heat, chemical reaction or weather factors.

**Friction Loss:** The loss of pressure in a flowing stream resulting from resistance to flow imposed by the inside of the pipe or hose and by changes in flow direction such as elbows and tees and also elevation.

**Heat Resistance:** The ability of a finished foam to withstand exposure to heat. (radiant, convective or conductive).

**High Energy System:** A foam generating system that adds the energy of the air source to the energy of the water pump. CAFS is a high energy foam delivery system.

**High Expansion Foam:** Special foam designed for high air-to-solution ratios that are greater than 200 parts air to each part foam solution.

**Hydrocarbon:** An organic compound containing only carbon and hydrogen.

**Hydrocarbon Pickup:** The characteristic of a fuel that is suspended or absorbed by expanded foam.

**Hydrophobic:** Water-hating (having the property of not mixing with water.)

**Hydrophilic:** Water-liking (having the property of mixing with water readily.)

**Ingestion:** To take things into the body by swallowing.

**Line Proportioner:** A device that siphons foam from a container to make a foam solution (i.e. an

eductor.)

**Low Energy System:** A foam generation system that uses the velocity energy of the water stream delivered from the water pump to mix air at the nozzle tip with the solution to deliver a finished foam. An aspirating foam tube is a low energy delivery system.

**Minimum Operating Temperature:** The lowest temperature a foam concentrate will proportion with venturi devices in accordance with UL and USDA/USFS requirements.

**NFPA - Requirements / Recommendations:** Standards established for foam extinguishing systems as outlined in Standard #11, 16, and 30.

**Oleophobic:** Oil hating - having the ability of shedding gasoline, oil and similar products.

**Pickup:** The induction of foam concentrate into the water stream by the use of a venturi.

**Polar Solvent:** In fire fighting, any flammable liquid which destroys regular foams. Polar solvents aggressively attack the bubble by mixing with the water in the bubble structure. Polar solvents require special foam agents and mix ratios. Examples: esters, ethers, alcohols, aldehydes and ketones.

**Polymeric Membrane:** A thin, durable, plastic layer formed on a polar solvent fuel surface protecting the foam cells from destruction by the fuel.

**Pour Point:** The lowest temperature at which a foam concentrate is fluid enough to pour, generally about 5°F above the freezing point.

**Pressure Drop:** The net loss in flowing water pressure between any two points in a hydraulic system. Pressure is determined by friction loss, head loss or other losses due to the insertion of an orifice plate, venturi or other restriction into a section of pipe or hose.

**Proportioner:** The device where foam concentrate and water are proportionately mixed to form a foam solution. Also a unit that pumps foam concentrate into the attack hose line.

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**Protein:** Complex nitrogen compound derived from natural vegetative and animal sources. The hydrolysis products of protein provide exceptionally stable, cohesive, adhesive and heat resistant properties to foam.

**Protein Foam Concentrate:** Concentrated solution of hydrolyzed protein with select chemicals added to obtain fire resistance and other desirable characteristics.

**Quarter-Life (Drain Time):** The time required in minutes for one-fourth of the total liquid solution to drain from the finished foam. Also referred to as 25% drainage time.

**Residual Pressure:** The pressure existing in a line at a specific flow. (As opposed to static pressure.)

**Short Term Retardant:** A viscous water based substance wherein water is the suppressing agent.

**Skin Fire:** A flammable liquid fire such as a spill on a solid surface where the liquid is not present in a depth exceeding one inch.

**Slug Flow:** CAFS only - when the foam solution is not rich enough or unevenly mixes with air, inadequate mixing occurs sending pockets or slugs of water and air to the nozzle.

**Soluble:** The ability to become readily dissolved or mixed.

**Spray Pattern:** The pattern produced by a divergent flow of fully formed subdivided foam – the pattern varying with the nozzle pressure and the adjustment of the spray creating device.

**Static Pressure:** The pressure existing in a line during a no flow situation. This can be considerably higher than residual pressure.

**Submergence:** Plunging of foam beneath the surface of burning liquid resulting in a partial breakdown of the foam structure and coating of the foam with the burning liquid.

**Suppressant:** An agent used to extinguish flaming or glowing phases of combustion by direct application to the burning fuel.

**Surface Active Agent (Surfactant):** A chemical that lowers the surface tension of a liquid.

**Syndet:** Synthetic detergent or cleaning agent.

**Upstream:** The direction from which the water is flowing.

**Venturi:** A constricted portion of a pipe or tube, which increases water velocity, momentarily, reducing its pressure. In this reduced pressure area, foam concentrates are introduced in many types of proportioning equipment.

**Viscosity:** The measurement of a foam concentrate's resistance to flow.

**Wetting Agent:** A chemical that, when added to water, reduces the surface tension and increases the wetting effectiveness of the solution and causes it to spread and penetrate exposed objects more effectively. A wetting agent may not be a foam concentrate.

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