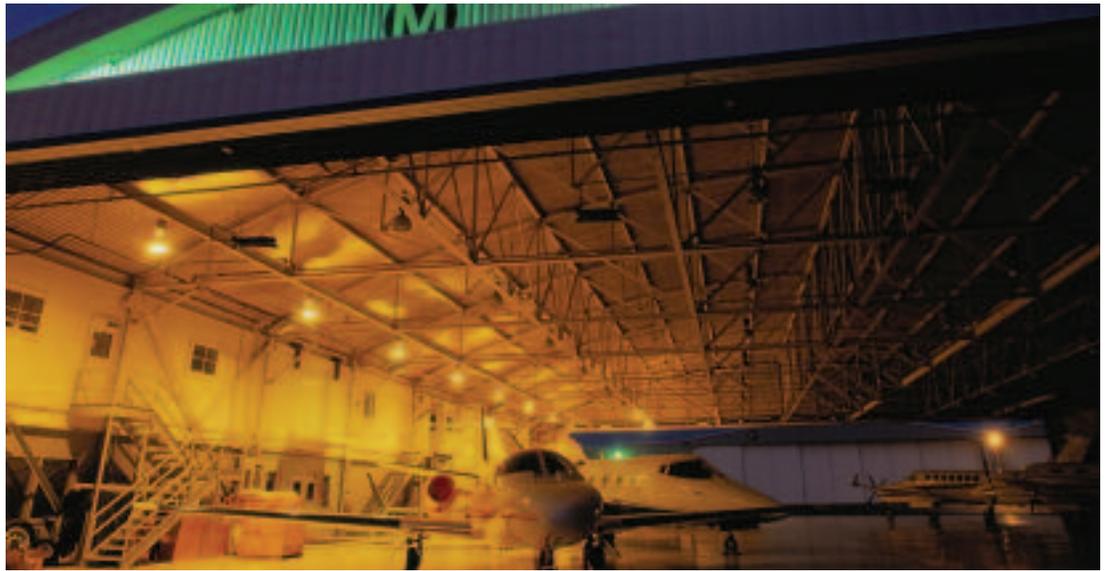
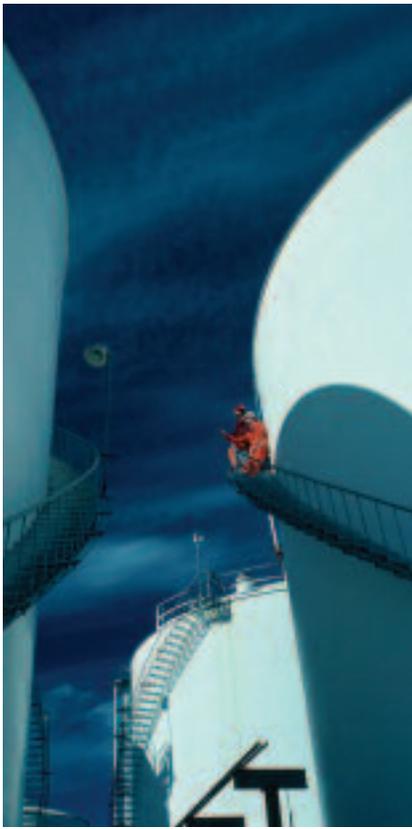




SECURITY BLANKET

Foam Fire Protection Products





REAL DANGERS DEMAND REAL SOLUTIONS

If your business manufactures, stores, or transports flammable liquids, the thought of a devastating fire always burns in the back of your mind. Be as prepared as possible with reliable ANSUL® firefighting foam products.

FOR THE POWER OF FOAM, GO TO THE SOURCE

In the 1960s, ANSUL teamed with the U.S. Navy to develop the first foam-compatible dry chemical; later introducing the twin-agent concept combining the fast knockdown capability of dry chemical with the securing power of aqueous film-forming foam (AFFF). In 1988, ANSUL chemists invented ANSULITE® 3x3 Foam Concentrate, the first alcohol-resistant AFFF capable of being used at a 3% concentrate on both polar-solvent and hydrocarbon fuels. Today, ANSUL provides a full line of quality foam concentrates, agent storage tanks, proportioning equipment, and discharge devices.



Since 1939, ANSUL has led the fire suppression industry by continually creating innovations to provide better protection. ANSUL offers the widest selection of premium foam agents and equipment found anywhere and focuses on developing new solutions and improving existing ones.

EXHAUSTIVE TESTING ■ QUALITY AND RELIABILITY IN EVERY COMPONENT

GLOBAL NETWORK OF AUTHORIZED DISTRIBUTORS ■ UL LISTED ■ FM APPROVED

FOAM FACTS

WHAT IS FIREFIGHTING FOAM?

Firefighting foam is made of three ingredients — a foam concentrate, water, and air. The concentrate is mixed with water (proportioning), creating a foam solution. That solution is mixed with air (aspirated) to produce the foam, which is very fluid, readily flowing over liquid surfaces. The foam itself is a stable mass of small, air-filled bubbles with a lower density than oil, gasoline, or water.

Balanced pressure proportioning is the most common method used for foam system applications. The foam concentrate pressure is balanced with the water pressure at the proportioner inlet allowing the proper amount of foam concentrate to be metered into the water stream.

With an aspirating discharge device, foam solution passes through an orifice, past air inlets, and into an expansion area to produce expanded foam.

In nonaspirating devices, the foam solution doesn't mix with air until it first passes through the orifice and discharge outlet.

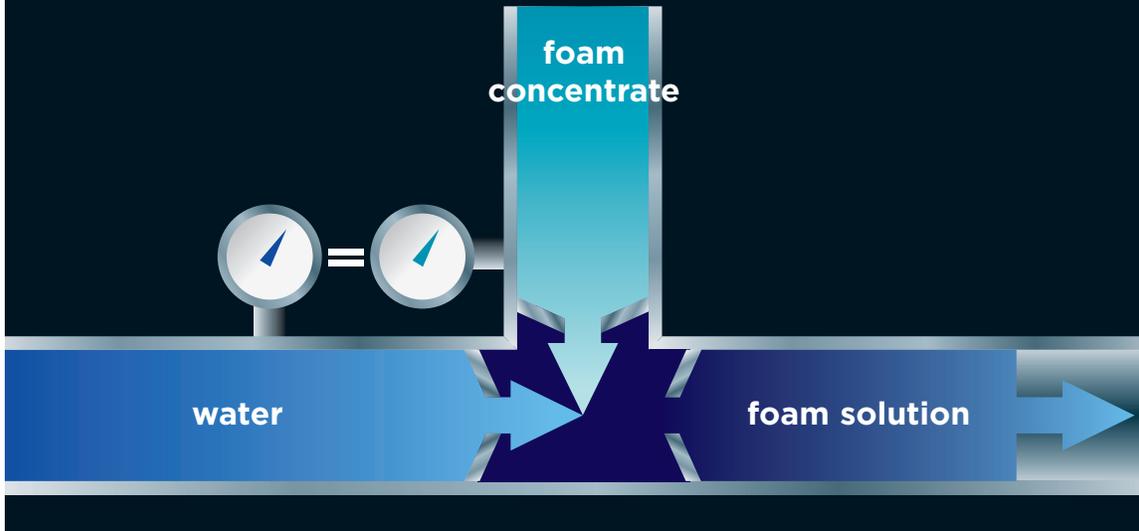
HOW DOES FOAM WORK?

Firefighting foam agents suppress fire by separating the liquid fuel from the air (oxygen) it needs to burn. Depending on the type of foam agent, this is done in one of several ways:

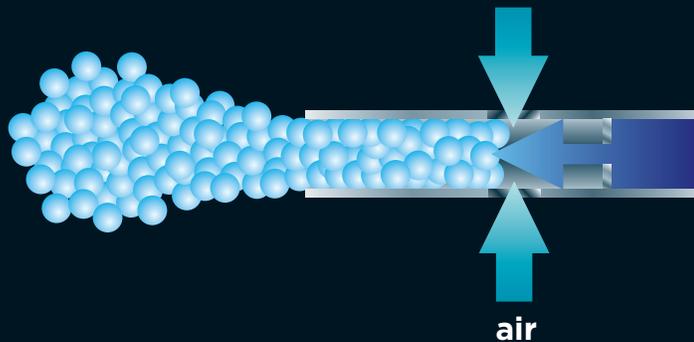
- the foam blankets the fuel surface, smothering the fire and separating the flames from the fuel surface
- the foam cools the fuel and adjacent heat and ignition sources
- the foam suppresses the release of flammable vapors that can mix with air

An AFFF agent forms an aqueous film on the surface of the hydrocarbon fuel. An alcohol-resistant concentrate (AR-AFFF) will form a polymeric membrane on a polar-solvent fuel.

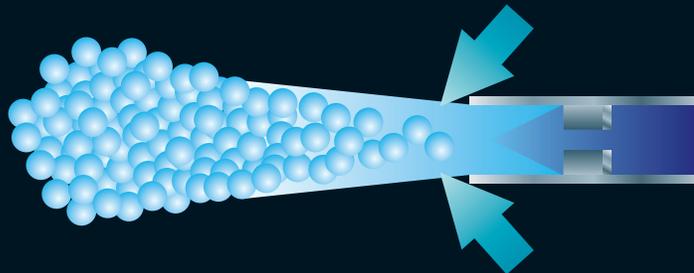
BALANCED PRESSURE PROPORTIONING



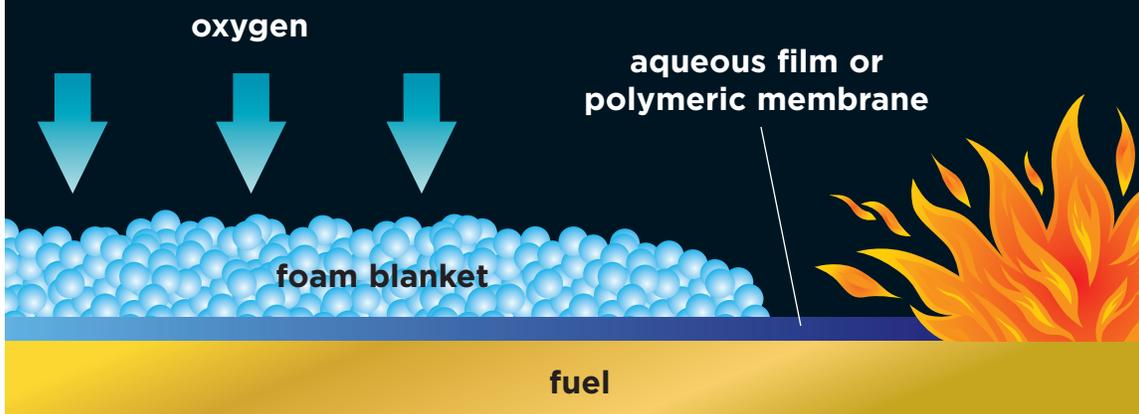
ASPIRATING DISCHARGE



NONASPIRATING DISCHARGE



FOAM AGENT AT WORK



WHERE ARE FOAM AGENTS USED?

- TRUCK LOADING RACKS
- REFINERIES
- PIPELINE PUMPING STATIONS
- POWER PLANTS
- AIRPORTS
- HELIPORTS AND HELIDECKS
- MARINE VESSELS
- MANUFACTURING PLANTS
- LARGE SPILLS
- STORAGE TANKS
- CHEMICAL PLANTS
- OFFSHORE PLATFORMS
- AIRCRAFT HANGARS
- CRASH-FIRE-RESCUE VEHICLES
- MINING FACILITIES
- MARINE DOCKS
- WAREHOUSES
- HAZARDOUS MATERIAL SPILL CONTROL

THE RIGHT FOAM FOR THE RIGHT FIGHT

CLASS A FOAM AGENTS

Formulated using fluorine-free surfactants, Class A foams reduce the water's surface tension to form a clinging blanket that suppresses combustible vapors while cooling the fuel.

Applied on the ground or through the air, **SILV-EX**® foam immediately wets, cools, and insulates a fire. It's especially effective in fighting forest fires and fires in coal mines, power generation (coal bunkers), structures, tire and rubber factories, lumber mills, and paper warehouses.

Created to perform specifically on Class A combustible materials, **ANSUL-A**™ foam is compatible for use in compressed air foam systems (CAFS) over the use range of 0.1% to 1.0%.

CLASS B FOAM AGENTS

ANSUL offers many foams to help fight Class B fires (petroleum-based products, flammable and combustible liquids, LNG, and rubber).

ANSULITE® **Aqueous Film-Forming Foam (AFFF)** can be applied through a wide variety of delivery systems, making them extremely versatile. This is an obvious choice for airports, refineries, manufacturing plants, municipal fire departments, and other operations involving the transportation, processing, or handling of flammable liquids. ANSULITE AFFF is available as 1%, 3%, and 6% concentrates or as 1% and 3% freeze-protected concentrates.

Based on AFFF chemistry to which a polymer is added, **ANSULITE**® **Alcohol-Resistant AFFF Concentrates (AR-AFFF)** are effective on fires involving polar solvents, such as ethanol, as well as hydrocarbon fuels like gasoline. In 1988, chemists at ANSUL invented ANSULITE 3x3 Foam Concentrate, the first alcohol-resistant AFFF capable of being used as a 3% concentrate on both polar-solvent and hydrocarbon fuels. ANSUL scientists later developed it in an exclusive low viscosity formula. ANSULITE ARC 3% or 6% can be proportioned according to the type of fuel — hydrocarbon or polar solvents.



Recommended for extinguishing fires involving hydrocarbons, **Protein Foams** at 3% concentrate produce stable mechanical foam with good expansion properties and excellent burnback resistance characteristics. Typically, protein foams are used to protect flammable and combustible liquids where they are stored, transported, and processed.

Compared to protein foams, **Fluoroprotein Foam Concentrates** provide better control and extinguishment, greater fluidity, and superior resistance to fuel contamination. Fluoroprotein foams are useful for hydrocarbon vapor suppression and have been recognized as very effective fire suppression agents for subsurface injection into hydrocarbon fuel storage tanks.

Available as a 3% concentrate with excellent resistance to fuel contamination, ANSUL Fluoroprotein demonstrates good burnback resistance and is especially effective on fires involving hydrocarbon bulk storage and handling, such as refineries and petrochemical facilities.

HIGH-EXPANSION FOAM AGENTS

Especially useful on fuels such as liquefied natural gas (cryogenic fuels) for vapor dispersion and control, High-Expansion Foam Concentrates are used with air aspirating foam generators for applying foam to large areas in total flooding and three-dimensional applications (warehouses, ship cargo holds, mine shafts). Based on combinations of hydrocarbon surfactants and solvents, high-expansion foams are effective on hydrocarbon spill fires of most types and in confined areas.

For use on all Class A, B, and LNG fires, **JET-X**® high-expansion foam is available as a 2.75% concentrate. Capable of flooding large rooms and enclosures when used with JET-X high-expansion generators, JET-X foam effectively suppresses all types of spill fires. Also use JET-X foam with medium-expansion equipment.

- Minimal water damage to structure or contents
- Hazardous run-off is reduced compared to sprinkler systems requiring large volumes of water
- Little or no damage to electrical equipment



AFFF (AQUEOUS FILM-FORMING FOAM)

	ANSULITE® 1% CONCENTRATE*	ANSULITE® 3% CONCENTRATE*	ANSULITE® 6% CONCENTRATE
Approvals/Listings	See foam agent data sheets for specific product approvals and listings		
Recommended Foam Equipment**	(1, 2, 3A, 3B, 4, 5, 6, 7)	(1, 2, 3A, 3B, 4, 5, 6, 7)	(1, 2, 3A, 3B, 4, 5, 6, 7)
Characteristics	Produces high-quality foam - can be applied through a wide variety of foam delivery systems including nonaspirated nozzles - excellent flame knockdown - good burnback resistance		
Typical Applications	Municipal fire departments, airports, refineries, petrochemical facilities, manufacturing plants or any operation involving transporting, processing or handling flammable liquids		
Class A Fuels	Acceptable		
Class B Fuels (Hydrocarbon)	Spills	Highly recommended - air-aspirated or nonaspirated nozzles†	
	Tanks (Topside)	Recommended	
	Tanks (Subsurface)	Recommended	
	Overhead Sprinkler Spray Systems	Recommended - air-aspirated or nonaspirated nozzles	

ALCOHOL-RESISTANT AFFF

	ANSULITE® 3x3 LOW VISCOSITY 3% CONCENTRATE	ANSULITE® ARC 3% OR 6% CONCENTRATE
Approvals/Listings	See foam agent data sheets for specific product approvals and listings	
Recommended Foam Equipment**	(1, 2, 3A, 3B, 4, 5, 6, 7)	(1, 2, 3A, 3B, 4, 5, 6, 7)
Characteristics	Unique to all firefighting foams - a low viscosity foam concentrate that can be applied at 3% on both hydrocarbon and polar-solvent fuels	Versatile firefighting foam. Designed for 3% on hydrocarbons, 6% on polar-solvent fuels
Typical Applications	Any area or operation involving polar-solvent or hydrocarbon fuels	
Class A Fuels	Acceptable	
Class B Fuels (Hydrocarbon and/or polar solvent)	Spills	Highly recommended - air-aspirated or nonaspirated nozzles†
	Tanks (Topside)	Recommended
	Tanks (Subsurface)	Recommended
	Overhead Sprinkler Spray Systems	Highly recommended - especially for mixed Class B fuel groups

CLASS A FOAM

	SILV-EX® CONCENTRATE	ANSUL-A™ CONCENTRATE
Approvals/Listings	See foam agent data sheets for specific product approvals and listings	
Recommended Foam Equipment**	(1, 2, 3A, 3B, 4, 7, 8)	
Characteristics	Designed specifically for Class A fuels including wood, paper, coal, rubber and plastics	
Typical Applications	Forest and grass fires, coal mine and bunker fires, tire fires, structure fires	Coal mine and bunker fires, tire fires, structure fires
Class A Fuels	Highly Recommended	
Class B Fuels	Not recommended on most Class B Fuels. For specific uses through sprinkler systems, consult ANSUL	

* Also available in low temperature versions

** Equipment Key: 1 Handline nozzles

2 Eductors

3A Standard sprinkler heads

3B Foam water sprinkler heads

4 Balanced pressure proportioners

5 Foam chambers

6 High back-pressure forcing foam makers

7 Monitors

8 Medium and high expansion foam generators

† Certain polar solvents require use of air-aspirated nozzles

HIGH EXPANSION FOAM

	JET-X® CONCENTRATE	
Approvals/Listings	See foam agent data sheets for specific product approvals and listings	
Recommended Foam Equipment**	(2, 4, 8)	
Characteristics	Effective extinguishing ability for all types of spill fires. Designed for use in both high expansion and medium expansion equipment	
Typical Applications	Aircraft hangars, warehouses, LNG vapor dispersion, ship cargo areas, mine and bunker fires, tire fires, structure fires	
Class A Fuels	Recommended	
Class B Fuels (Hydrocarbon)	Spills	Limited use - medium expansion nozzles
	Tanks (Topside)	Not recommended
	Tanks (Subsurface)	Not recommended
	Overhead Sprinkler Spray Systems	Not recommended

PROTEIN FOAM

	3% REGULAR PROTEIN CONCENTRATES	
Approvals/Listings	See foam agent data sheets for specific product approvals and listings	
Recommended Foam Equipment**	(1, 2, 3B, 4, 5, 7)	
Characteristics	Produces highly stabilized air foam - good expansion properties - excellent burnback resistance - can be used with all types of water through most conventional foam hardware	
Typical Applications	Applications involving hydrocarbon bulk storage and handling - such as refineries and petrochemical facilities	
Class A Fuels	Acceptable	
Class B Fuels (Hydrocarbon)	Spills	Recommended - air-aspirated nozzles only
	Tanks (Topside)	Recommended
	Tanks (Subsurface)	Not recommended
	Overhead Sprinkler Spray Systems	Recommended - with foam water sprinklers only

FLUOROPROTEIN FOAM

	3% FLUOROPROTEIN CONCENTRATES	
Approvals/Listings	See foam agent data sheets for specific product approvals and listings	
Recommended Foam Equipment**	(1, 2, 3B, 4, 5, 6, 7)	
Characteristics	Better control and extinguishing ability and greater fluidity than protein foams - excellent resistance to fuel contamination - good burnback resistance	
Typical Applications	Applications involving hydrocarbon bulk storage and handling - such as refineries and petrochemical facilities	
Class A Fuels	Acceptable	
Class B Fuels (Hydrocarbon)	Spills	Recommended - air-aspirated nozzles only
	Tanks (Topside)	Recommended
	Tanks (Subsurface)	Recommended
	Overhead Sprinkler Spray Systems	Recommended - with foam water sprinklers only

* Also available in low temperature versions

** Equipment Key: 1 Handline nozzles

2 Eductors

3A Standard sprinkler heads

3B Foam water sprinkler heads

4 Balanced pressure proportioners

5 Foam chambers

6 High back-pressure forcing foam makers

7 Monitors

8 Medium and high expansion foam generators

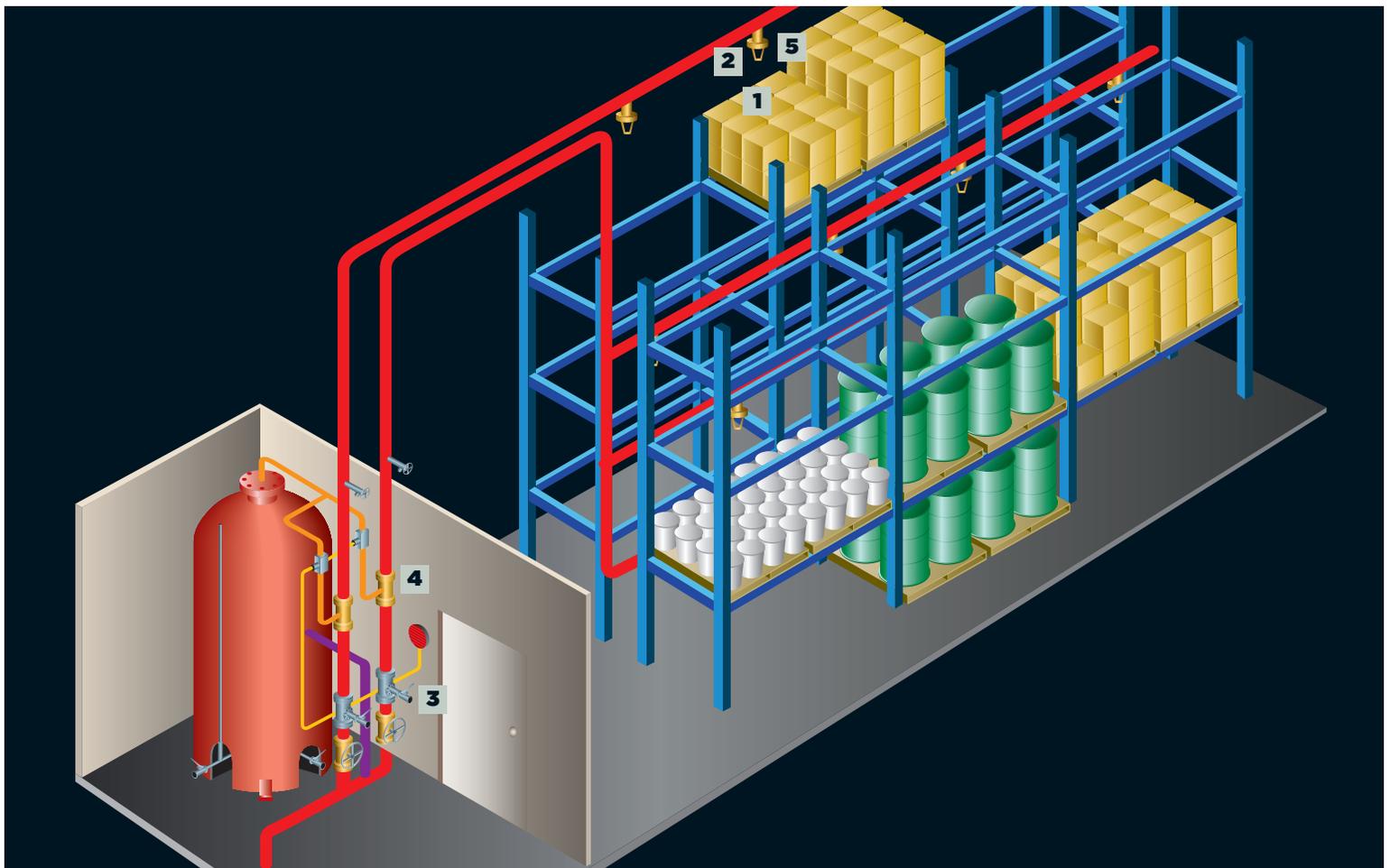
† Certain polar solvents require use of air-aspirated nozzles

FOAM-WATER SPRINKLER SYSTEMS

The following diagram and description represent the operation of a typical foam-water sprinkler system. Although many types of systems are available, a basic foam system always requires foam agent storage, proportioning equipment, one or more discharge devices, and a manual and/or automatic means of detecting the fire and actuating the system.

FOR A WET PIPE CLOSED-HEAD FOAM/WATER SPRINKLER SYSTEM:

- 1** Fire breaks out in the rack storage area of a flammable liquid warehouse.
- 2** Rising heat ruptures the quartzoid bulbs in the sprinkler heads, starting the flow of water.
- 3** Flowing water through the alarm check valve opens the hydraulic foam concentrate valve to the foam proportioner if required.
- 4** Foam concentrate flows from the bladder tank into the proportioner where it's mixed with the flowing water at the designed foam solution percentage.
- 5** Foam is generated as the foam solution discharges through the sprinkler heads onto the fire.



FOAM SYSTEM COMPONENTS

Along with foam agents, a fixed foam system is typically comprised of proportioning equipment, discharge devices, and detection/control components.

PROPORTIONING EQUIPMENT introduces the foam concentrate into a flowing stream of water to produce a foam solution. There are many methods of proportioning, but fixed foam systems typically use balanced pressure proportioning equipment.

- **Bladder Tank Systems** use a UL approved bladder to store the foam concentrate. System water pressure squeezes the bladder, providing foam concentrate at the same pressure to the proportioner. No external power source is required and little maintenance is needed.
- **Pump Skids** are used in combination with atmospheric storage tanks. While foam concentrate is pumped from the tank to the proportioner, an automatic pressure balancing valve matches foam concentrate pressure to water pressure.
- **In-Line Balanced Pressure Proportioners** are similar to pump skids, except that the proportioning assembly, including the automatic balancing valve, is remote from the pump and storage tank. A pressure control valve is added to the foam concentrate return line to maintain a constant pressure.

DISCHARGE DEVICES not only produce expanded foam but also direct the flow at the point of application. Air-aspirating devices mix air with the foam solution to form an expanded mass of bubbles, and various nonaspirating devices can be used with some low-expansion foam agents.



- **Foam Monitors** control the horizontal and vertical directions of large capacity discharge streams. Water-oscillating monitors automatically move side-to-side using water pressure as the energy source. Remote controlled monitors use an electric joystick to control horizontal, vertical and stream pattern. Other monitors are operated manually using a tiller bar or housewheel.
- **Sprinkler Heads** are available in both aspirating and non-aspirating versions. Aspirated sprinkler heads are required for protein and fluoroprotein foams in deluge systems. Non-aspirated heads with AFFF agents are more economical and can be used in either open deluge or closed-head sprinkler systems.
- **Foam Chambers and Foam Makers** are air-aspirating devices designed to protect flammable liquid storage tanks by applying foam down the inside of the tank.
- **Foam Generators** deliver large quantities of expanded foam by blowing air through a screen coated with a high-expansion foam solution. Because of its high-expansion ratio, little water is required to generate large quantities of foam.

In many fire protection applications, an automatic **DETECTION AND CONTROL SYSTEM** is required. Thermal detectors or quick-response flame detectors are installed to provide input to an electronic control panel. The control panel provides vital output functions (sounding alarms, shutting off fuel pumps, monitoring water flow, supervising valves, and actuating foam systems).



PUTTING FOAM TO THE TEST

When evaluating what foam concentrate to use, consider these factors: is the agent listed and approved? Recognized independent testing agencies — Underwriters Laboratories (UL) and Factory Mutual (FM) — as well as the federal government and international agencies, establish standards for product performance. Manufacturers must meet the standard initially and subject their products to subsequent testing. ANSUL foam concentrates meet continued compliance with regulatory specifications.

ANSUL foam concentrates also maximize performance while minimizing environmental impact and human exposure hazards. All concentrates are biodegradable — both in nature and in sewage treatment facilities.

Shelf life is the length of time over which ANSUL foam concentrates remain stable without significant changes in performance. ANSULITE AFFF, JET-X high-expansion, and SILV-EX Class A foam concentrates have a normal shelf life of 20-25 years. All other non-synthetic ANSUL foam agents have a normal shelf life of 7-10 years.

The only way to ensure foam quality is through periodic testing as recommended by the NFPA Standard 11, which suggests testing be done annually. For convenience, customers may send samples of ANSUL products directly to ANSUL for on-site testing (pH, density, refractive index, and fire performance), along with additional comments and recommendations.

TRAINING IS KEY

ANSUL places as much emphasis on the correct use of foam concentrates as the products themselves. Two separate 2-day training sessions are recommended for all personnel involved with foam systems. **Foam System Design and Specification Training** includes all areas of the design, equipment selection, foam agent application, and

installation of fixed foam systems. **Foam Systems Service and Maintenance Training** focuses on the correct service and maintenance procedures for various systems.

ANSUL FIRE SCHOOL includes classroom instruction but emphasizes hands-on training. In fact, during our 3-day program, each student will learn proper techniques while fighting 22 different flammable liquid and gas fires designed to simulate actual hazards.

The new **Fire Technology Center** is a state-of-the-art 10,600-square-foot complex that provides customers with comprehensive training on the science and business of fire protection. The facility, with an expansive viewing area of the outdoor test field, includes instructional classrooms for technical product and technology education, a conference room, a functional product display room and a burn room for hands-on training and product demonstrations.

NOT JUST IN THE FOAM BUSINESS — IN THE BUSINESS OF PROTECTING LIVES

Since 1939, ANSUL has led the fire suppression industry by continually creating innovations to provide better protection. If your business manufactures, stores, or transports flammable liquids, be as prepared as possible with ANSUL, offering the widest selection of premium foam agents and equipment found anywhere.

You rely on ANSUL equipment. So, every step is taken to ensure that your confidence is at its highest when you need it most. Make ANSUL your fire protection partner throughout your business.



Ansul Incorporated
One Stanton Street
Marinette, WI 54143-2542

800-862-6785 (United States, Canada)
715-735-7411 (International)
www.ansul.com

