FOAM/WATER SPRINKLER SYSTEMS

CONVERTING EXISTING WATER SPRINKLER SYSTEMS TO FOAM

Foam/water sprinkler systems are more economical than a water-only system, when evaluated for the same risk. They provide for actual extinguishment of the fire and a lower water demand. The conversion assists in the reduction of property loss.

In most instances, fires cause more than structural and inventory damages. Many manufacturing and storage facilities have various flammable products that are protected by water sprinkler systems alone. The water sprinkler system may extinguish the fire; however, this type system has the two potential problems. If the water only system is not capable of quick extinguishment, the product containers can erupt and spill. Also it typically requires a great deal of water to extinguish a flammable liquid that is miscible in water or in many cases, the flammable liquid floats on the water and then the water becomes the vehicle that spreads the fire. Both the large amounts of water and the flammable liquids are normally washed into the local drain systems which can contaminate the water supplies and aquifers. Along with the financial loss of the manufacturing/storage facilities and products, there is the expense of contamination cleanup. Foam systems can facilitate in quick extinguishment and water reduction. In a single year, the National Fire Protection Association documented fires that involved flammable liquids with direct losses of over $1 billion. The extended losses including the close of businesses, cost of environmental cleanup and increased insurance costs are inconceivable.

When a water sprinkler system is converted to a water/ foam system, explicit standards and regulations must be met. These include NFPA Standards; 13 Installation of Sprinkler Systems, NFPA 16 Installation of Foam-Water Deluge Systems and Foam - Water Spray Systems and NFPA 30 Flammable and Combustible Liquids Code.

These NFPA standards are to be used in conjunction with local authority regulations or with the facilities insurance company requirements. Before any conversion procedures are instituted, consult with the governing authorities for design approval.

Many flammable liquids, being water miscible, require a special foam in the foam/water sprinkler system, and 3% AR-AFFF is most widely used. This product is proportioned at 3% for both hydrocarbons and polar solvents. Where polar solvent liquids are stored, the 3% concentrate system is the most economical because less foam concentrate and smaller foam pumps or bladder tanks are required.

The Balanced Pressure Proportioning foam system is the most effective and efficient method of mixing foam concentrate with the water supply. With this method, the foam concentrate is introduced into the sprinkler riser at a similar pressure as the water. The concentrate flows into a ratio controller, also called a proportioner, which is installed in the sprinkler riser. The ratio controller meters the correct quantity of foam concentrate into the water as the water flows through the ratio controller to the sprinkler heads.

It is very important to determine the system demand which will dictate the size of the ratio controller installed in the riser.

It is most important that the foam concentrate is fed into the ratio controller at a pressure which is similar to the water pressure as it enters into the same ratio controller. This is accomplished by using either a Bladder Tank or a positive displacement foam pump with any In-line Balanced Pressure Proportioner (ILBP.)

Using the bladder tank system, the foam concentrate is stored in a flexible bladder which is installed inside a pressure vessel. When the system is installed correctly, a portion of the pressurized water supply is routed into the bladder tank which forces the foam concentrate out of the bladder through piping and into the ratio controller. When the system water pressurizing the bladder tank fluctuates, the pressure of the foam concentrate discharging out of the bladder tank fluctuates simultaneously.

The in-line balanced proportioner system (ILBP) incorporates an atmospheric foam concentrate storage tank and uses a positive displacement foam pump to pump the concentrate from the tank to the ILBP unit, installed in the sprinkler riser. The pump capacity is sized to supply foam to the entire sprinkler system. A pressure balancing valve is installed in each ILBP and reacts accordingly to the pressure demands of the foam/water sprinkler system. If the volume of concentrate is not required due to a low demand from the sprinkler system, the unused foam concentrate is returned back to the atmospheric storage tank via a pressure control valve, installed in the concentrate return line. An ILBP is normally more suitable on a closed head foam/ water sprinkler system or where a bladder tank can not be located in close proximity to the sprinkler riser and the concentrate has to be pumped some distance from the concentrate supply tank to where the ratio controller is installed.

The ILBP system requires a reliable foam concentrate pump and if electric driven, a dedicated electrical supply. Bladder tanks will work as long as there is sufficient water pressure and the necessary minimum flow rate is achieved through the ratio controller which will enable accurate proportioning. The system can be balanced hydraulically to enable the foam concentrate and the water to meet at the ratio controller at similar pressures.

Following the steps in this document allows for the conversion of existing water-only sprinkler systems to foam systems at a reasonable cost. The cost of the conversion is outweighed by the multiple benefits provided to the owner of the facility once the conversion takes place.

For more information or technical assistance contact Buckeye and we will assist you in designing a suitable and cost efficient system that complies with all relevant NFPA Fire Codes.

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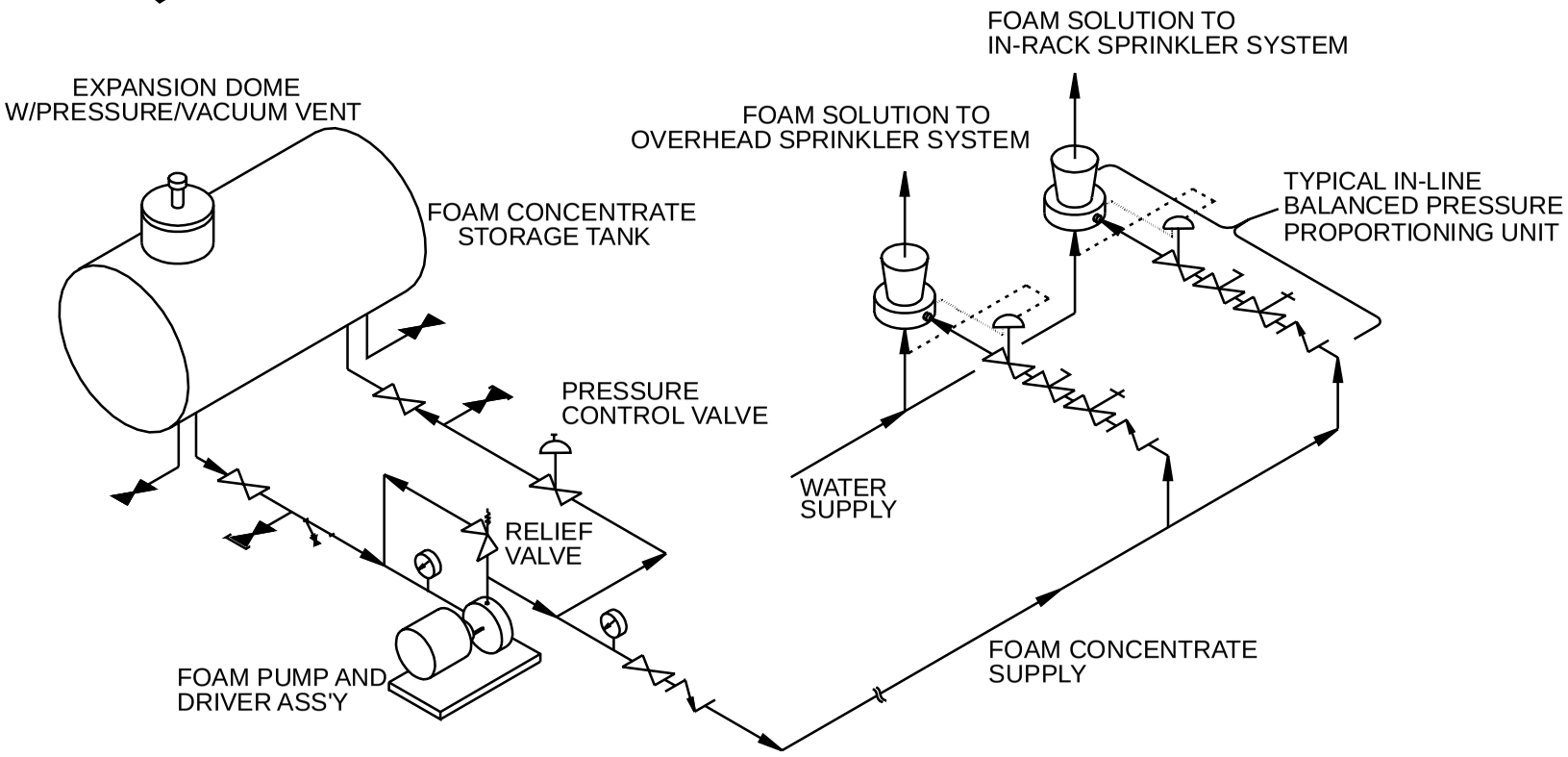
WAREHOUSE WITH I.L.B.P. MODULES



TYPICAL LAYOUT FOR ILBP SYSTEM IN WAREHOUSE
with CLOSED HEAD, OVERHEAD AND IN-RACK SYSTEMS

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