



## TECHNICAL DATA

## FOAM MAKER APPLICATION

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

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### 1. DESCRIPTION

Foam makers are in-line foam discharge devices. Foam makers are utilized in hazards where enhanced foam qualities are needed to protect a hazard. Foam makers are generally installed in hazards that are sumped or diked.

### 2. RULES OF INSTALLATION

NFPA 11 directs the designer to locate or space the foam makers around a dike or sump based on the discharge rate of the foam maker. The design requirements are as follows:

A. Foam makers with flow rates less than 60 gpm (15,82 lpm) shall be located so that the outlet is not farther than 30 ft (9 m) from any point in the dike.

Explanation: Due to the low flow rate, foam makers that discharge less than 60 gpm (15,82 lpm) should only be used on small dikes or should be used on narrow dike areas. Refer to Figures #1 and #2.

B. Foam makers with flow rates greater than 60 gpm (15,82 lpm) shall be located that the outlets are equally spaced around the dike area but in no case spaced farther than 60 ft (18,2 m) apart.

Explanation: The larger flow rate allows for the fact that foam solution will flow faster and cover more uniformly than water alone. Foam maker discharge outlets are always to be located that uniform coverage of the dike floor is achieved. Foam solution discharge rates larger than 60 gpm (15,82 lpm) are to be equally spaced over the linear dimension of the dike. Refer to Figure #3.

#### Installation Note

When applying foam solution on any hazard, plunging of the foam solution should be avoided. This is especially true of foam makers. Foam makers are inline foam discharge devices and do not have an end that applies directly to the fuel surface. Foam makers are referred to as low level foam discharge devices because the discharge end of the foam maker is piped on the hazard side of the dike, and then drop the supply down the side of the dike wall, then the piping is directed towards the dike wall. The dike wall acts as a splash board where the foam solution drops down the wall to the surface of the fuel. The foam solution spreads at a fast rate across the fuel surface. Synthetic foam solution is oleo-phobic which means it resists fuel pick-up. Although it will resist mixing with the liquid fuel, the foam blanket will trap some of the flammable vapors in the bubble structure that is the foam blanket, due to this, plunging of the foam blanket in the liquid fuel should be avoided.

### 3. INSTALLING THE FOAM MAKER

Normal methods of piping the discharge outlet from the foam maker is to install the foam maker horizontal and rise up from the end of the foam maker with a 90 degree elbow, cross over the dike wall, drop down the dike wall and terminate in a 45 degree elbow directed back towards the wall. Refer to figure #4.

### 4. SUPPLYING THE FOAM MAKER

There are many methods that are available in NFPA 11 to supply foam makers protecting a dike or sump area.

#### A. Semi-fixed:

Semi-fixed supplies are supplies that have all the near supply piping and discharge piping installed around the dike area. The proportioning device may or may not be in place. Semi-fixed piping installations will have supply outlet(s) located in the piping around the dike. The end of the supply outlet may have a proportioning device such as an eductor sized for the discharge rate of the foam maker(s). A bulk supply of foam concentrate is permanently located and piped to the eductor. A water supply can be fed from a fire hose that is connected from a yard hydrant to the eductor.

Many petro-chemical and petro facilities have a private fire brigade equipped with large portable foam concentrate and water supplies. Another way of providing semi-fixed supplies would be to have a foam solution supply that terminates in a Storz or hose connection. The end connection is then fed foam solution by a fire truck or foam tender at a flow rate and pressure of the design of the piping. Refer to Figure #5 for examples of Semi-fixed installations.

#### B. Fixed Supplies

Fixed foam solution supplies are sometimes known as automatic supplies. The supply of foam solution is supplied from a central location. At the central location there will be a riser normally equipped with a deluge valve and a proportioning device. The proportioning device is normally a concentrate controller when a foam bladder tank is used or an ILBP where pressure injection proportioning is utilized through a foam bladder tank or a foam pump.

The discharge piping is supplied from a fixed riser and is installed between the riser and the piping used to protect the dike or sump area. This installation is what would be considered normal for most sprinkler designers and installers. Refer to Figure #6 for examples of Fixed Supplies.

### 5. SIZING THE FOAM MAKER(S)

Viking offers (4) different sizes in foam makers. Refer to Foam Data Page 192 for specific design information.

Sizing the foam maker requires that the discharge density is known for the fuel and the area that is to be protected is known. Once



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the total demand discharge is known, the discharge locations of the foam makers must be determined. After the number of discharge locations is determined, that amount can be divided into the demand discharge.

**Example:** (Refer to Figure #6)

A dike is 120' (36,5 m) x 120' (36,5 m). The tanks located within the dike contain diesel fuel (a hydrocarbon). The density for protecting a hydrocarbon is .10 gpm/ft<sup>2</sup> ( 4 lpm/m<sup>2</sup>). Multiply 120' (36,5 m) by 120' (36,5 m) to determine the area of the dike. The area of the dike is 14,400 ft<sup>2</sup> (1322.24 m<sup>2</sup>). Multiply the area by the density to determine the minimum flow rate.

$$14,400 \text{ ft}^2 \times .10 \text{ gpm/ft}^2 = 1440 \text{ gpm}$$

**NOTE: THIS IS THE MINIMUM FLOW RATE. FOR ESTIMATING PURPOSES, AN ADDITIONAL 15% SHOULD BE ADDED TO THE WATER DEMAND. ALWAYS HYDRAULICALLY CALCULATE THE SYSTEM TO DETERMINE THE AREA FLOW RATE.**

$$1440 \text{ gpm} \times 1.15\% = 1656 \text{ gpm}$$

The minimum number of outlets required for the dike is (8). Divide the demand flow rate required for the dike by the number of discharge outlets to be used. Once the flow rate per discharge device is determined, a foam maker can be selected.

$$1656 / 8 = 207 \text{ gpm per discharge outlet}$$

A flow rate per foam maker is estimated to be 207 gpm. From Viking Foam Data Page 192, two discharge devices could be selected. The VFM-25 has a flow range of 63 gpm through 232 gpm, the VFM-30 has a flow range of 117 gpm through 486 gpm. If the VFM-25 foam maker is selected, a required pressure at the foam maker would be 100 psi to provide the 207 gpm.

If a VFM-30 is selected, the required pressure at the foam maker would be 30 psi to provide 207 gpm. Depending on the available water supply either device could be utilized. If you do not have the foam chamber/maker sizing calculation program from Viking, please visit our web site at [www.vikinggroupinc.com](http://www.vikinggroupinc.com).

**NOTE: GENERALLY THE AREA OF THE DIKE FLOOR THAT IS NOT OCCUPIED BY A TANK BOTTOM IS THE DETERMINED AREA. IN THE EXAMPLE ABOVE IF (5) TANKS WITH BOTTOMS COVERING 200 FT<sup>2</sup> (18,58 M<sup>2</sup>) EACH WERE LOCATED IN THE DIKE, 1000 FT<sup>2</sup> (92,9 M<sup>2</sup>) COULD BE DEDUCTED FROM THE AREA OF 14,400 FT<sup>2</sup> (1339,5 M<sup>2</sup>).**

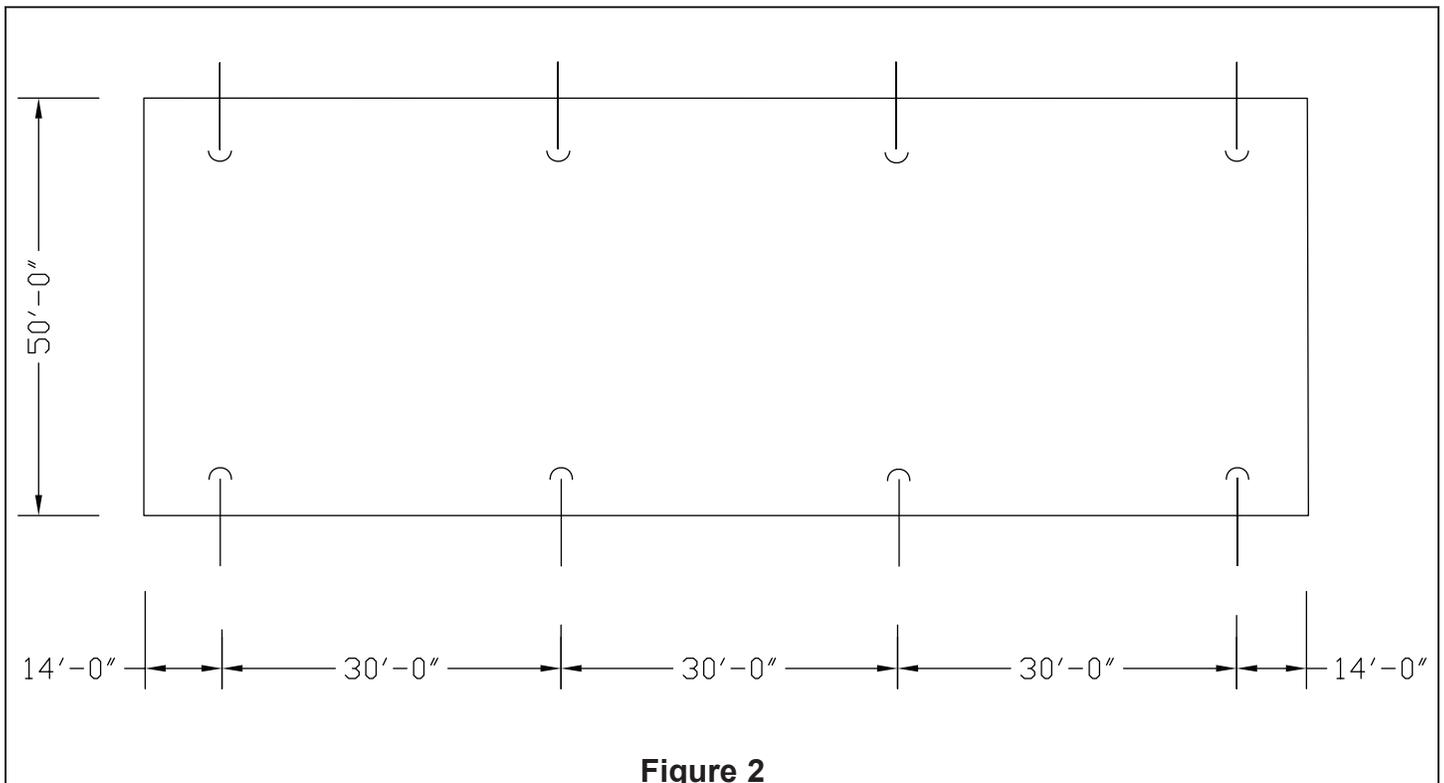
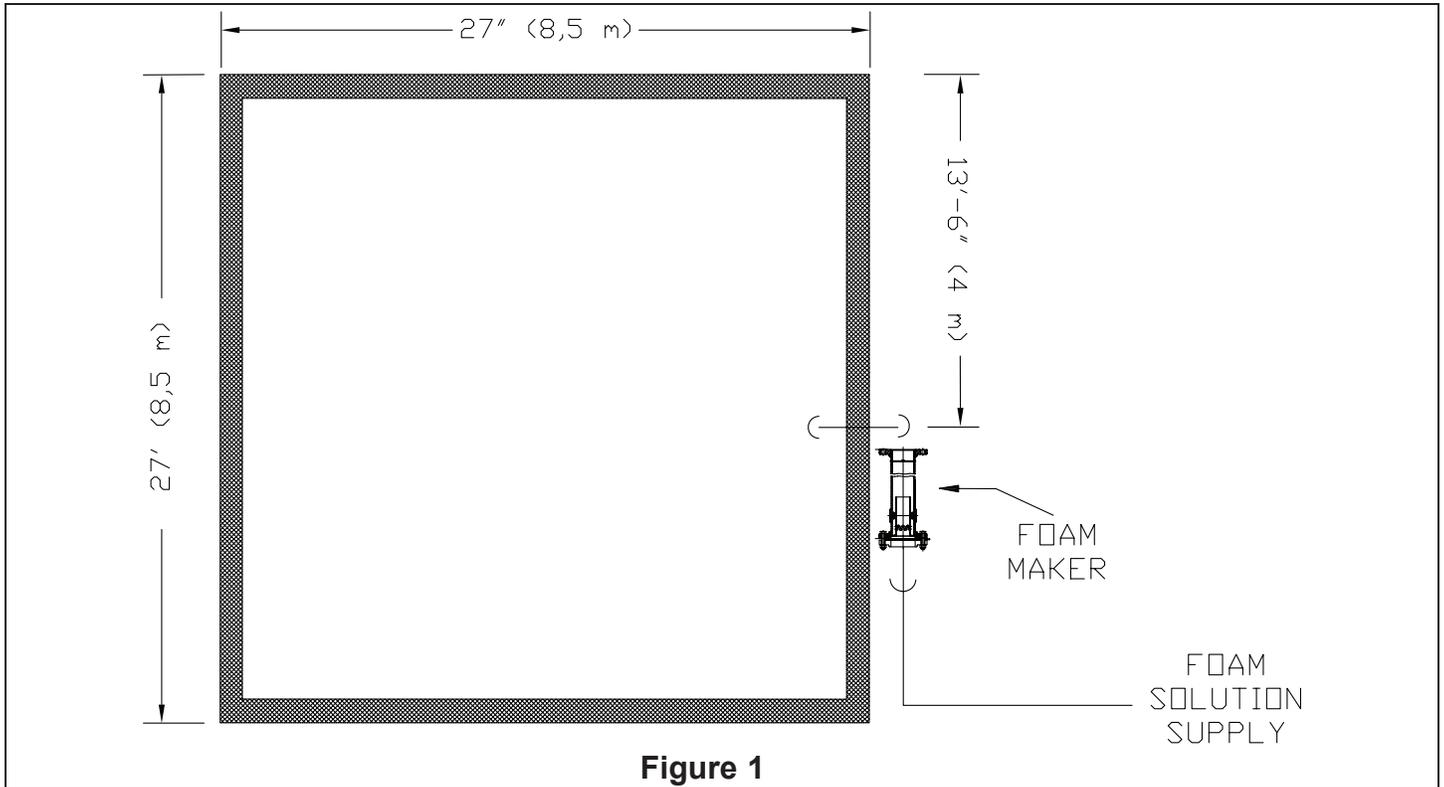


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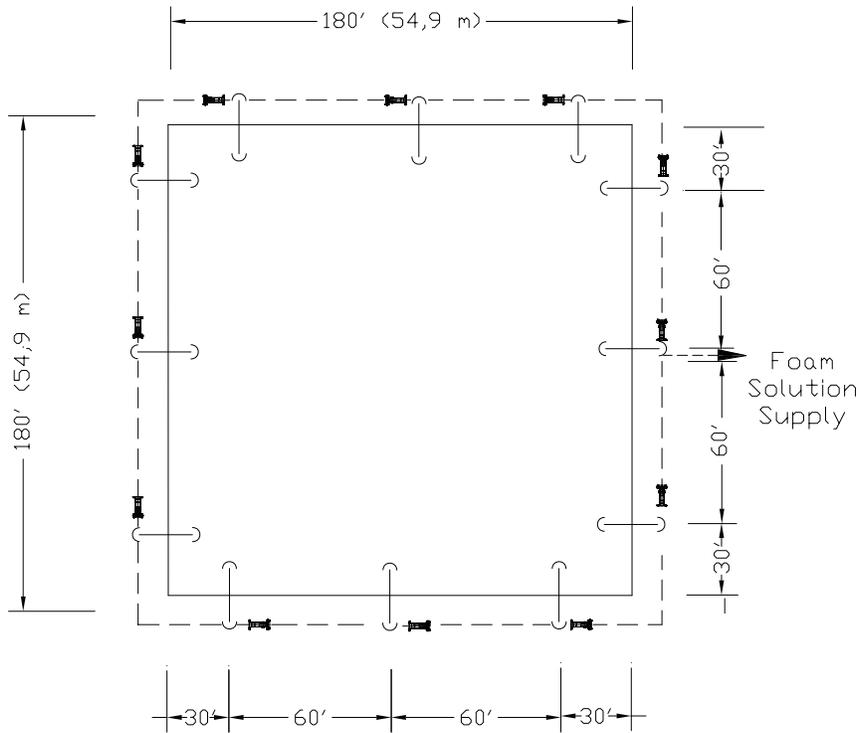


Figure 3

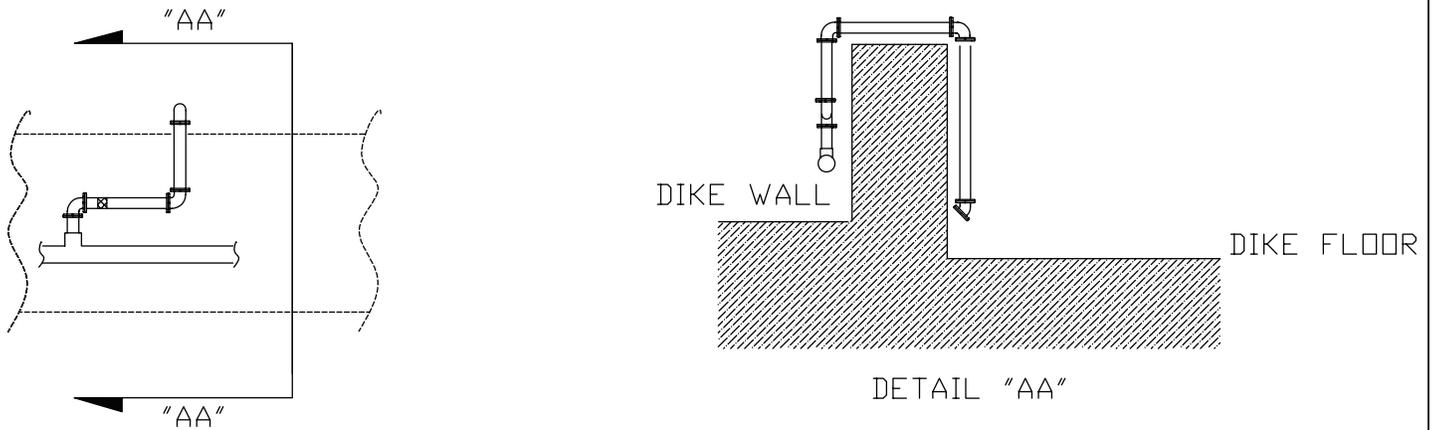


Figure 4



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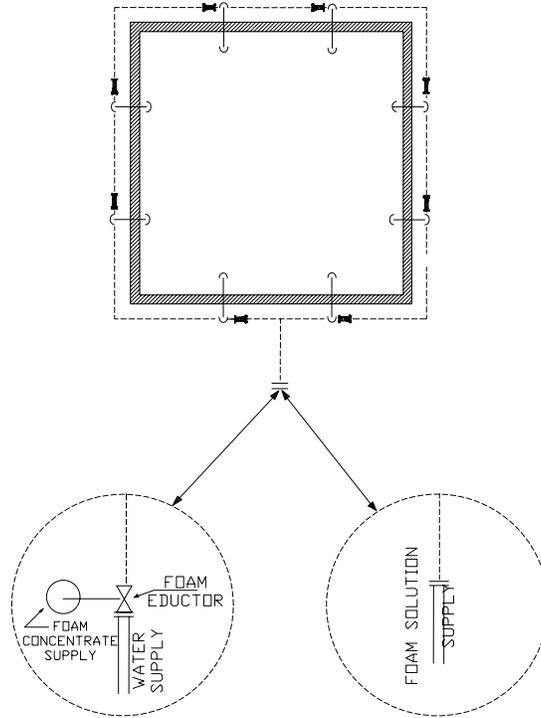


Figure 5

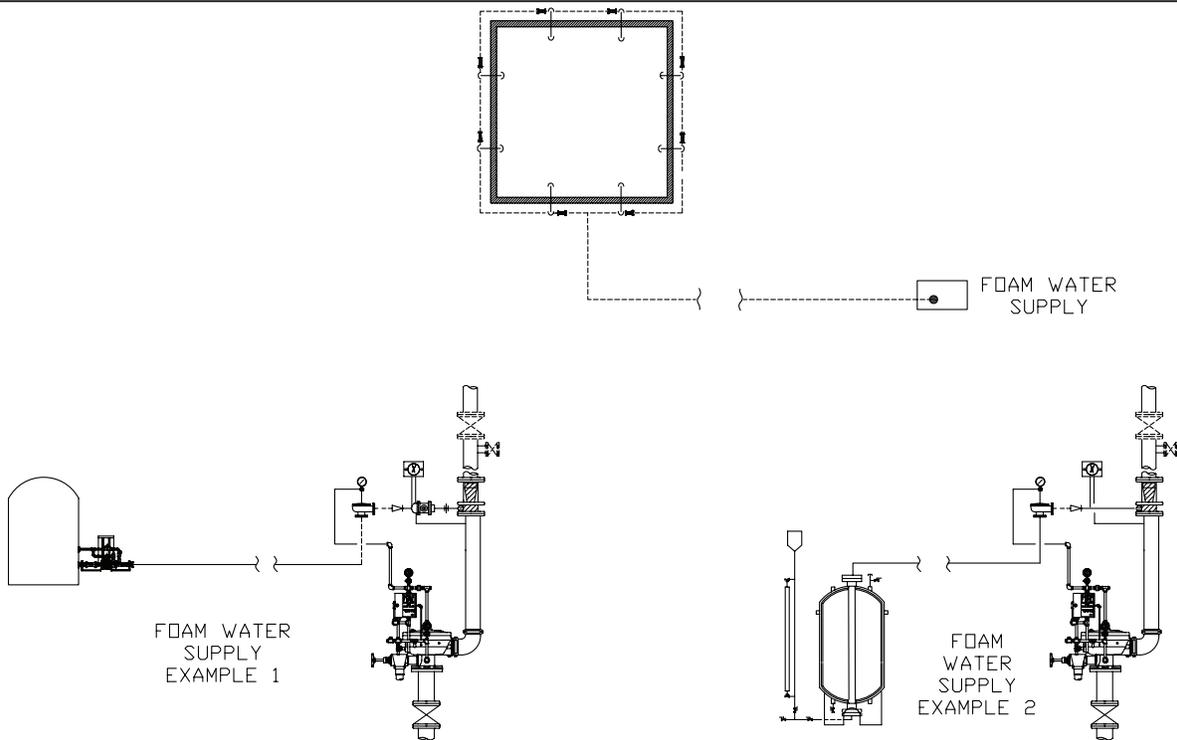


Figure 6



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