

## Foam Ratio Controller

Proportioning Devices | Model KFP

### 1 General description

The ratio controller accurately proportions foam concentrate into a water stream over a wide range of water flow rates. Ratio controllers are an integral part of an approved foam system. In addition to the ratio controller, the main components of the approved foam system are specific foam concentrates, a foam storage tank, a concentrate control valve, and foam discharge devices.

The system must be designed so that the ratio controller can accurately proportion foam over the range of flow rates expected during the system operation.

Intended for use in Wet, Dry, Deluge, Preaction, and Refrigerated Area applications. Please refer to specific system manual(s) for further information. This technical data is intended for trained experts. For further information, please contact the appropriate sales office in **Section 5** or refer to the technical documentation. The contents of the publication are subject to modifications without notice.

### 2 Listings and approvals

The ratio controller is FM Approved and/or UL Listed as part of a fire extinguishing system combining designated foam concentrates, bladder tanks and discharge devices.

Approved and Listed system components can be found at [www.approvalguide.com](http://www.approvalguide.com) and <https://iq.ulprospector.com>.

- FM Approved – Low expansion foam systems (FM5130)
- UL Listed – GFGV.EX6015, GHXV.EX26572, GLKX.EX27989 (UL162)

**NOTICE**

*Other international approval certificates may be available upon request.*

“SFFF compatible” refers to this product as being part of a SFFF Foam system that has been tested to recognised standards. Not all configurations are available. Please consult technical data and/or the Approval/Listing for usage requirements.

### 3 Technical data

#### 3.1 Construction features

- Available Grooved with 2" (DN50), 2.5" (DN65), 3" (DN80), 4" (DN100), 6" (DN150), 8" (DN200) connections and Flanged with 3" (DN80), 4" (DN100), 6" (DN150), 8" (DN200) connections
- Nickel aluminium bronze construction for superior corrosion protection
- Horizontal or vertical installation
- Direction of flow indicator on body
- For use with fresh or salt water
- Identification tag plate



*Images for illustrative purposes only*



### 3.2 Standard materials

| Nickel aluminum bronze version (Grooved and flanged connections) |                                               |
|------------------------------------------------------------------|-----------------------------------------------|
| Body & nozzle                                                    | Nickel aluminum bronze UNS C95800 - ASTM B148 |
| Orifice                                                          | UNS-C36000 or C46400 or C95800                |
| Snap ring                                                        | Stainless steel                               |
| See notes in <b>Table 3.4.1</b> for ordering information         |                                               |

Table 3.2.1 - Standard materials

### 3.3 Standard design specifications

| All Versions                     |                                   |
|----------------------------------|-----------------------------------|
| Design pressure                  | 250 psi / 17.2 bar (1.7 MPa)      |
| Design temperature range         | 14 °F to 120 °F (-10 °C to 49 °C) |
| Operating temperature range      | 35 °F to 120 °F (1.7 °C to 49 °C) |
| Minimum operating inlet pressure | 30 psi / 2.1 bar (0.2 MPa)        |
| Maximum operating inlet pressure | 175 psi / 12.1 bar (1.2 MPa)      |
| Proportioning range              | Refer to <b>table 3.4.2</b>       |

Table 3.3.1 - Standard design specifications

### 3.4 Ordering information

- Select connection type from grooved (**Table 3.4.1**) or flanged (**Table 3.4.2**).  
**Note:** Take care in selecting the correct part number due to different connection styles (different grooved outside diameters, flanges and threads).
- Select the foam concentrate type in **table 3.4.1** or **3.4.2**
- The minimum and maximum flow demand of the sprinkler/deluge system must be known to ensure correct selection of the ratio controller. The required minimum flow rate should be higher than the minimum flow rate shown in **table 3.4.1** or **3.4.2** for the Foam type selected in **Step 2**. The required higher flow rate should be lower than the maximum flow rate shown in **table 3.4.1** or **3.4.2**. If more than one size of ratio controller is suitable then size selection can then be based on the size of the riser or supply pipework into which the ratio controller will be installed.  
**Note:** The flow rates in the FM Approval and UL Listing sometimes differ. Please check the flow range data in **table 3.4.1** or **3.4.2** according to the FM Approval or UL Listing.
- After selecting the size, check the appropriate graph in **section 7.2.1** to ensure the required flows are possible at the available system pressure. If not, it may be necessary to increase to the next pipe size.

**Ordering example:** A ratio controller is required with a minimum flow rate of 65 GPM and a maximum flow rate of 570 GPM, using AFFF 3% S foam concentrate in a 3" wet system. The ordering part number is KFP089NB.

## Foam Ratio Controller

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| Connection        |                       | Foam type <sup>3</sup> | Part number<br>(Nickel<br>aluminium<br>bronze) <sup>2</sup> | Foam inlet<br>orifice size |       | FM Approved                       |       |                                   |       | UL Listed                         |       |                                   |       |
|-------------------|-----------------------|------------------------|-------------------------------------------------------------|----------------------------|-------|-----------------------------------|-------|-----------------------------------|-------|-----------------------------------|-------|-----------------------------------|-------|
| Body<br>grooved   | Foam inlet<br>grooved |                        |                                                             | Inch                       | mm    | Minimum<br>flow rate <sup>1</sup> |       | Maximum<br>flow rate <sup>1</sup> |       | Minimum<br>flow rate <sup>1</sup> |       | Maximum<br>flow rate <sup>1</sup> |       |
|                   |                       |                        |                                                             |                            |       | GPM                               | l/min | GPM                               | l/min | GPM                               | l/min | GPM                               | l/min |
| 2"<br>(60.3 mm)   | 1.5"<br>(48.3 mm)     | AFFF 1% Ultra LT C6    | KFP060NA                                                    | 0.110                      | 2.79  | 50                                | 189   | 311                               | 1,177 | 50                                | 189   | 225                               | 851   |
|                   |                       | Enviro AX1 1%          | KFP060NR                                                    | 0.110                      | 2.79  | -                                 | -     | -                                 | -     | 28                                | 106   | 218                               | 825   |
|                   |                       | AFFF 3% S C6           | KFP060NB                                                    | 0.190                      | 4.83  | 50                                | 189   | 311                               | 1,177 | 50                                | 189   | 225                               | 851   |
|                   |                       | AFFF 3% M C6           | KFP060NM                                                    | 0.190                      | 4.83  | 50                                | 189   | 311                               | 1,177 | 50                                | 189   | 225                               | 851   |
|                   |                       | ARC 3X3S C6            | KFP060NJ                                                    | 0.218                      | 5.54  | 100                               | 378   | 310                               | 1,173 | 102                               | 386   | 228                               | 862   |
|                   |                       | Enviro USP 3%          | KFP060NL                                                    | 0.221                      | 5.61  | 95                                | 360   | 309                               | 1,170 | -                                 | -     | -                                 | -     |
|                   |                       | Enviro ARK 3%          | KFP060NP                                                    | 0.227                      | 5.77  | 93                                | 352   | 300                               | 1,136 | -                                 | -     | -                                 | -     |
|                   |                       | Enviro USP 3%          | KFPS060NL                                                   | 0.127                      | 3.22  | 49                                | 185   | 104                               | 394   | -                                 | -     | -                                 | -     |
| 2.5"<br>(76.1 mm) | 1.5"<br>(48.3 mm)     | Enviro ARK 3%          | KFPS060NP                                                   | 0.127                      | 3.22  | 40                                | 151   | 101                               | 382   | -                                 | -     | -                                 | -     |
|                   |                       | AFFF 1% Ultra LT C6    | KFP076NA                                                    | 0.141                      | 3.56  | 50                                | 189   | 475                               | 1,798 | 50                                | 189   | 377                               | 1,426 |
|                   |                       | Enviro AX1 1%          | KFP076NR                                                    | 0.141                      | 3.58  | -                                 | -     | -                                 | -     | 40                                | 151   | 403                               | 1,525 |
|                   |                       | AFFF 3% S C6           | KFP076NB                                                    | 0.252                      | 6.40  | 50                                | 189   | 475                               | 1,798 | 50                                | 189   | 375                               | 1,419 |
|                   |                       | AFFF 3% M C6           | KFP076NM                                                    | 0.252                      | 6.40  | 50                                | 189   | 475                               | 1,798 | 50                                | 189   | 375                               | 1,419 |
|                   |                       | ARC 3X3S C6            | KFP076NJ                                                    | 0.272                      | 6.93  | 160                               | 606   | 475                               | 1,798 | 165                               | 625   | 376                               | 1,423 |
|                   |                       | Enviro USP 3%          | KFP076NL                                                    | 0.276                      | 7.01  | 155                               | 587   | 502                               | 1,900 | -                                 | -     | -                                 | -     |
|                   |                       | Enviro ARK 3%          | KFP076NP                                                    | 0.278                      | 7.06  | 165                               | 625   | 475                               | 1,798 | -                                 | -     | -                                 | -     |
| 2.5"<br>(73.0 mm) | 1.5"<br>(48.3 mm)     | AFFF 1% Ultra LT C6    | KFP073NA                                                    | 0.141                      | 3.56  | 50                                | 189   | 475                               | 1,798 | 50                                | 189   | 377                               | 1,426 |
|                   |                       | Enviro AX1 1%          | KFP073NR                                                    | 0.141                      | 3.58  | -                                 | -     | -                                 | -     | 40                                | 151   | 403                               | 1,525 |
|                   |                       | AFFF 3% S C6           | KFP073NB                                                    | 0.252                      | 6.40  | 50                                | 189   | 475                               | 1,798 | 50                                | 189   | 375                               | 1,419 |
|                   |                       | AFFF 3% M C6           | KFP073NM                                                    | 0.252                      | 6.40  | 50                                | 189   | 475                               | 1,798 | 50                                | 189   | 375                               | 1,419 |
|                   |                       | ARC 3X3S C6            | KFP073NJ                                                    | 0.273                      | 6.93  | 160                               | 606   | 475                               | 1,798 | 165                               | 625   | 376                               | 1,423 |
|                   |                       | Enviro USP 3%          | KFP073NL                                                    | 0.276                      | 7.01  | 155                               | 587   | 502                               | 1,900 | -                                 | -     | -                                 | -     |
|                   |                       | Enviro ARK 3%          | KFP073NP                                                    | 0.278                      | 7.06  | 165                               | 625   | 475                               | 1,798 | -                                 | -     | -                                 | -     |
| 3"<br>(88.9 mm)   | 1.5"<br>(48.3 mm)     | AFFF 1% Ultra LT C6    | KFP089NA                                                    | 0.205                      | 5.21  | 50                                | 189   | 750                               | 2,839 | 50                                | 189   | 750                               | 2,839 |
|                   |                       | Enviro AX1 1%          | KFP089NR                                                    | 0.209                      | 5.31  | -                                 | -     | -                                 | -     | 60                                | 227   | 745                               | 2,820 |
|                   |                       | AFFF 3% S C6           | KFP089NB                                                    | 0.362                      | 9.19  | 50                                | 189   | 750                               | 2,839 | 50                                | 189   | 750                               | 2,839 |
|                   |                       | AFFF 3% M C6           | KFP089NM                                                    | 0.362                      | 9.19  | 50                                | 189   | 750                               | 2,839 | 50                                | 189   | 750                               | 2,839 |
|                   |                       | ARC 3X3S C6            | KFP089NJ                                                    | 0.392                      | 9.96  | 300                               | 1,136 | 750                               | 2,839 | 300                               | 1,136 | 750                               | 2,839 |
|                   |                       | AFFF 6% Ultra          | KFP089NC                                                    | 0.508                      | 12.90 | -                                 | -     | -                                 | -     | 50                                | 189   | 738                               | 2,793 |
|                   |                       | LS-xMax 3%             | KFP089NN                                                    | 0.362                      | 9.19  | -                                 | -     | -                                 | -     | 50                                | 189   | 740                               | 2,801 |
|                   |                       | Enviro USP 3%          | KFP089NL                                                    | 0.392                      | 9.96  | 360                               | 1,363 | 775                               | 2,934 | -                                 | -     | -                                 | -     |
| 4"<br>(114.3 mm)  | 2"<br>(60.3 mm)       | Enviro ARK 3%          | KFP089NP                                                    | 0.394                      | 10.01 | 285                               | 1,079 | 770                               | 2,915 | -                                 | -     | -                                 | -     |
|                   |                       | AFFF 1% Ultra LT C6    | KFP114NA                                                    | 0.279                      | 7.09  | 50                                | 189   | 1,250                             | 4,731 | 48                                | 182   | 1,250                             | 4,731 |
|                   |                       | Enviro AX1 1%          | KFP114NR                                                    | 0.279                      | 7.09  | -                                 | -     | -                                 | -     | 48                                | 182   | 1,230                             | 4,656 |
|                   |                       | AFFF 3% S C6           | KFP114NB                                                    | 0.485                      | 12.32 | 50                                | 189   | 1,250                             | 4,731 | 50                                | 189   | 1,250                             | 4,731 |
|                   |                       | AFFF 3% M C6           | KFP114NM                                                    | 0.485                      | 12.32 | 50                                | 189   | 1,250                             | 4,731 | 50                                | 189   | 1,250                             | 4,731 |
|                   |                       | ARC 3X3S C6            | KFP114NJ                                                    | 0.513                      | 13.03 | 400                               | 1,514 | 1,250                             | 4,731 | 400                               | 1,514 | 1,250                             | 4,731 |
|                   |                       | FP 3% C6               | KFP114NK                                                    | 0.513                      | 13.03 | -                                 | -     | -                                 | -     | 75                                | 284   | 1,250                             | 4,731 |
|                   |                       | AFFF 6% Ultra          | KFP114NC                                                    | 0.670                      | 17.01 | -                                 | -     | -                                 | -     | 50                                | 189   | 1,265                             | 4,789 |
|                   |                       | LS-xMax 3%             | KFP114NN                                                    | 0.485                      | 12.32 | -                                 | -     | -                                 | -     | 46                                | 174   | 1,600                             | 6,057 |
|                   |                       | Enviro USP 3%          | KFP114NL                                                    | 0.529                      | 13.44 | 370                               | 1,401 | 1,250                             | 4,732 | -                                 | -     | -                                 | -     |
|                   |                       |                        | KFP114NL                                                    | 0.513                      | 13.03 | -                                 | -     | -                                 | -     | 420                               | 1,590 | 1,515                             | 5,735 |
|                   |                       | Enviro ARK 3%          | KFP114NP                                                    | 0.513                      | 13.03 | 400                               | 1,514 | 1,350                             | 5,110 | -                                 | -     | -                                 | -     |

**NOTES:**
<sup>1</sup> Please refer to graphs in **section 7.2** for specific flow rate parameters.

<sup>2</sup> NAB 73 mm and NAB 219 mm with 73 mm foam inlet are non standard and could be subject to additional lead time and price.

<sup>3</sup> Relevant foam types comply with the requirements of the EPA 2010/2015 PFOA Stewardship Program.

Table 3.4.1 - Ordering information (Grooved connection) - Table continued on next page

**INFORMATION**

Some of the available options may be not covered by the UL Listing or FM Approval. Please always make reference to the appropriate approval directory or guides or contact KCA for further assistance.

## Foam Ratio Controller

Proportioning Devices | Model KFP

| Connection       |                       | Foam type <sup>3</sup> | Part number<br>(Nickel<br>aluminium<br>bronze) <sup>2</sup> | Foam inlet<br>orifice size |       | FM Approved                       |       |                                   |        | UL Listed                         |       |                                   |        |
|------------------|-----------------------|------------------------|-------------------------------------------------------------|----------------------------|-------|-----------------------------------|-------|-----------------------------------|--------|-----------------------------------|-------|-----------------------------------|--------|
|                  |                       |                        |                                                             |                            |       | Minimum<br>flow rate <sup>1</sup> |       | Maximum<br>flow rate <sup>1</sup> |        | Minimum<br>flow rate <sup>1</sup> |       | Maximum<br>flow rate <sup>1</sup> |        |
| Body<br>grooved  | Foam inlet<br>grooved |                        |                                                             | Inch                       | mm    | GPM                               | l/min | GPM                               | l/min  | GPM                               | l/min | GPM                               | l/min  |
| 6"<br>(165.1 mm) | 2"<br>(60.3 mm)       | AFFF 1% Ultra LT C6    | KFP165NA                                                    | 0.358                      | 9.09  | 140                               | 530   | 2,300                             | 8,706  | 100                               | 378   | 2,300                             | 8,706  |
|                  |                       | AFFF 3% S C6           | KFP165NB                                                    | 0.700                      | 17.78 | 70                                | 265   | 2,300                             | 8,706  | 50                                | 189   | 2,300                             | 8,706  |
|                  |                       | AFFF 3% M C6           | KFP165NM                                                    | 0.700                      | 17.78 | 70                                | 265   | 2,300                             | 8,706  | 50                                | 189   | 2,300                             | 8,706  |
|                  |                       | ARC 3X3S C6            | KFP165NJ                                                    | 0.738                      | 18.75 | 750                               | 2,839 | 2,300                             | 8,706  | 750                               | 2,839 | 2,300                             | 8,706  |
|                  |                       | FP 3% C6               | KFP165NK                                                    | 0.738                      | 18.75 | -                                 | -     | -                                 | -      | 152                               | 575   | 2,300                             | 8,706  |
|                  |                       | AFFF 6% Ultra          | KFP165NC                                                    | 1.029                      | 26.14 | -                                 | -     | -                                 | -      | 200                               | 756   | 2,300                             | 8,706  |
|                  |                       | LS-xMax 3%             | KFP165NN                                                    | 0.700                      | 17.78 | -                                 | -     | -                                 | -      | 99                                | 375   | 3,050                             | 11,546 |
|                  |                       | Enviro USP 3%          | KFP165NL                                                    | 0.738                      | 18.75 | 845                               | 3,199 | 2,350                             | 8,896  | 990                               | 3,748 | 2,670                             | 10,105 |
| 6"<br>(168.3 mm) | 2"<br>(60.3 mm)       | Enviro ARK 3%          | KFP165NP                                                    | 0.770                      | 19.56 | 800                               | 3,028 | 2,400                             | 9,085  | -                                 | -     | -                                 | -      |
|                  |                       | AFFF 1% Ultra LT C6    | KFP168NA                                                    | 0.358                      | 9.09  | 140                               | 530   | 2,300                             | 8,706  | 100                               | 378   | 2,300                             | 8,706  |
|                  |                       | AFFF 3% S C6           | KFP168NB                                                    | 0.700                      | 17.78 | 70                                | 265   | 2,300                             | 8,706  | 50                                | 189   | 2,300                             | 8,706  |
|                  |                       | AFFF 3% M C6           | KFP168NM                                                    | 0.700                      | 17.78 | 70                                | 265   | 2,300                             | 8,706  | 50                                | 189   | 2,300                             | 8,706  |
|                  |                       | ARC 3X3S C6            | KFP168NJ                                                    | 0.738                      | 18.75 | 750                               | 2,839 | 2,300                             | 8,706  | 750                               | 2,839 | 2,300                             | 8,706  |
|                  |                       | FP 3% C6               | KFP168NK                                                    | 0.738                      | 18.75 | -                                 | -     | -                                 | -      | 152                               | 575   | 2,300                             | 8,706  |
|                  |                       | AFFF 6% Ultra          | KFP168NC                                                    | 1.029                      | 26.14 | -                                 | -     | -                                 | -      | 200                               | 756   | 2,300                             | 8,706  |
|                  |                       | LS-xMax 3%             | KFP168NN                                                    | 0.700                      | 17.78 | -                                 | -     | -                                 | -      | 99                                | 375   | 3,050                             | 11,546 |
| 8"<br>(219.1 mm) | 2.5"<br>(73.0 mm)     | Enviro USP 3%          | KFP168NL                                                    | 0.738                      | 18.75 | 845                               | 3,199 | 2,350                             | 8,896  | 990                               | 3,748 | 2,670                             | 10,105 |
|                  |                       | Enviro ARK 3%          | KFP168NP                                                    | 0.770                      | 19.56 | 800                               | 3,028 | 2,400                             | 9,085  | -                                 | -     | -                                 | -      |
|                  |                       | AFFF 1% Ultra LT C6    | KFP2196NA                                                   | 0.525                      | 13.34 | 200                               | 756   | 4,500                             | 17,033 | 200                               | 756   | 4,500                             | 17,033 |
|                  |                       | AFFF 3% S C6           | KFP2196NB                                                   | 0.975                      | 24.77 | 70                                | 265   | 4,500                             | 17,033 | 70                                | 265   | 4,500                             | 17,033 |
|                  |                       | AFFF 3% M C6           | KFP2196NM                                                   | 0.975                      | 24.77 | 70                                | 265   | 4,500                             | 17,033 | 70                                | 265   | 4,500                             | 17,033 |
|                  |                       | ARC 3X3S C6            | KFP2196NJ                                                   | 1.009                      | 25.63 | 1,400                             | 5,299 | 4,500                             | 17,033 | 1,400                             | 5,299 | 4,500                             | 17,033 |
|                  |                       | FP 3% C6               | KFP2196NK                                                   | 1.009                      | 25.63 | -                                 | -     | -                                 | -      | 256                               | 969   | 4,500                             | 17,033 |
|                  |                       | AFFF 6% Ultra          | KFP2196NC                                                   | 1.516                      | 38.62 | -                                 | -     | -                                 | -      | 346                               | 1,310 | 4,669                             | 17,674 |
| 8"<br>(219.1 mm) | 2.5"<br>(73.0 mm)     | LS-xMax 3%             | KFP2196NN                                                   | 0.975                      | 24.77 | -                                 | -     | -                                 | -      | 242                               | 946   | 4,942                             | 19,305 |
|                  |                       | Enviro USP 3%          | KFP2196NL                                                   | 1.009                      | 25.63 | 2,010                             | 7,609 | 4,640                             | 17,564 | 2,000                             | 7,570 | 5,050                             | 19,114 |
|                  |                       | Enviro ARK 3%          | KFP2196NP                                                   | 1.040                      | 26.42 | 1,900                             | 7,192 | 4,250                             | 16,088 | -                                 | -     | -                                 | -      |
|                  |                       | AFFF 1% Ultra LT C6    | KFP2193NA                                                   | 0.525                      | 13.34 | 200                               | 756   | 4,500                             | 17,033 | 200                               | 756   | 4,500                             | 17,033 |
|                  |                       | AFFF 3% S C6           | KFP2193NB                                                   | 0.975                      | 24.77 | 70                                | 265   | 4,500                             | 17,033 | 70                                | 265   | 4,500                             | 17,033 |
|                  |                       | AFFF 3% M C6           | KFP2193NM                                                   | 0.975                      | 24.77 | 70                                | 265   | 4,500                             | 17,033 | 70                                | 265   | 4,500                             | 17,033 |
|                  |                       | ARC 3X3S C6            | KFP2193NJ                                                   | 1.009                      | 25.63 | 1,400                             | 5,299 | 4,500                             | 17,033 | 1,400                             | 5,299 | 4,500                             | 17,033 |
|                  |                       | FP 3% C6               | KFP2193NK                                                   | 1.009                      | 25.63 | -                                 | -     | -                                 | -      | 256                               | 969   | 4,500                             | 17,033 |
| 8"<br>(219.1 mm) | 2.5"<br>(73.0 mm)     | AFFF 6% Ultra          | KFP2193NC                                                   | 1.516                      | 38.62 | -                                 | -     | -                                 | -      | 346                               | 1,310 | 4,669                             | 17,674 |
|                  |                       | LS-xMax 3%             | KFP2193NN                                                   | 0.975                      | 24.77 | -                                 | -     | -                                 | -      | 242                               | 946   | 4,942                             | 19,305 |
|                  |                       | Enviro USP 3%          | KFP2193NL                                                   | 1.009                      | 25.63 | 2,010                             | 7,609 | 4,640                             | 17,564 | 2,000                             | 7,570 | 5,050                             | 19,114 |
|                  |                       | Enviro ARK 3%          | KFP2193NP                                                   | 1.040                      | 26.42 | 1,900                             | 7,192 | 4,250                             | 16,088 | -                                 | -     | -                                 | -      |

**NOTES:**
<sup>1</sup> Please refer to graphs in **section 7.2** for specific flow rate parameters.

<sup>2</sup> NAB 73 mm and NAB 219 mm with 73 mm foam inlet are non standard and could be subject to additional lead time and price.

<sup>3</sup> Relevant foam types comply with the requirements of the EPA 2010/2015 PFOA Stewardship Program.

Table 3.4.1 - Ordering information (Grooved connection) - Continued

**INFORMATION**

Some of the available options may be not covered by the UL Listing or FM Approval. Please always make reference to the appropriate approval directory or guides or contact KCA for further assistance.

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| Connection                |                                                  | Foam type <sup>3</sup> | Part number |            | Foam inlet orifice size |       | FM Approved                    |       |                                |        | UL Listed                      |       |                                |        |
|---------------------------|--------------------------------------------------|------------------------|-------------|------------|-------------------------|-------|--------------------------------|-------|--------------------------------|--------|--------------------------------|-------|--------------------------------|--------|
|                           |                                                  |                        |             |            |                         |       | Minimum flow rate <sup>1</sup> |       | Maximum flow rate <sup>1</sup> |        | Minimum flow rate <sup>1</sup> |       | Maximum flow rate <sup>1</sup> |        |
| Body flanged <sup>2</sup> | Foam inlet grooved                               |                        | ANSI        | PN16       | Inch                    | mm    | GPM                            | l/min | GPM                            | l/min  | GPM                            | l/min | GPM                            | l/min  |
| 3"<br>(DN80)              | 1.5"<br>NPT (ANSI)<br>or<br>BSP (PN16)<br>Thread | AFFF 1% Ultra LT C6    | KFP080ANA   | KFP080PNA  | 0.205                   | 5.21  | 50                             | 189   | 750                            | 2,839  | 50                             | 189   | 750                            | 2,839  |
|                           |                                                  | Enviro AX1 1%          | KFP080ANR   | KFP080PNR  | 0.209                   | 5.31  | -                              | -     | -                              | -      | 60                             | 227   | 745                            | 2,820  |
|                           |                                                  | AFFF 3% S C6           | KFP080ANB   | KFP080PNB  | 0.362                   | 9.19  | 50                             | 189   | 750                            | 2,839  | 50                             | 189   | 750                            | 2,839  |
|                           |                                                  | AFFF 3% M C6           | KFP080ANM   | KFP080PNM  | 0.362                   | 9.19  | 50                             | 189   | 750                            | 2,839  | 50                             | 189   | 750                            | 2,839  |
|                           |                                                  | ARC 3X3S C6            | KFP080ANJ   | KFP080PNJ  | 0.392                   | 9.96  | 300                            | 1,136 | 750                            | 2,839  | 300                            | 1,136 | 750                            | 2,839  |
|                           |                                                  | AFFF 6% Ultra          | KFP080ANC   | KFP080PNC  | 0.508                   | 12.90 | -                              | -     | -                              | -      | 50                             | 189   | 738                            | 2,793  |
|                           |                                                  | LS-xMax 3%             | KFP080ANN   | KFP080PNN  | 0.362                   | 9.19  | -                              | -     | -                              | -      | 50                             | 186   | 740                            | 2,801  |
|                           |                                                  | Enviro USP 3%          | KFP080ANL   | KFP080PNL  | 0.392                   | 9.96  | 360                            | 1,363 | 775                            | 2,934  | -                              | -     | -                              | -      |
| 4"<br>(DN100)             | 2"<br>NPT (ANSI)<br>or<br>BSP (PN16)<br>Thread   | AFFF 1% Ultra LT C6    | KFP100ANA   | KFP100PNA  | 0.279                   | 7.09  | 50                             | 189   | 1,250                          | 4,731  | 48                             | 182   | 1,250                          | 4,731  |
|                           |                                                  | Enviro AX1 1%          | KFP100ANR   | KFP100PNR  | 0.279                   | 7.09  | -                              | -     | -                              | -      | 48                             | 182   | 1,230                          | 4,656  |
|                           |                                                  | AFFF 3% S C6           | KFP100ANB   | KFP100PNB  | 0.485                   | 12.32 | 50                             | 189   | 1,250                          | 4,731  | 50                             | 189   | 1,250                          | 4,731  |
|                           |                                                  | AFFF 3% M C6           | KFP100ANM   | KFP100PNM  | 0.485                   | 12.32 | 50                             | 189   | 1,250                          | 4,731  | 50                             | 189   | 1,250                          | 4,731  |
|                           |                                                  | ARC 3X3S C6            | KFP100ANJ   | KFP100PNJ  | 0.513                   | 13.03 | 400                            | 1,514 | 1,250                          | 4,732  | 400                            | 1,514 | 1,250                          | 4,731  |
|                           |                                                  | FP 3% C6               | KFP100ANK   | KFP100PNK  | 0.513                   | 13.03 | -                              | -     | -                              | -      | 75                             | 284   | 1,250                          | 4,731  |
|                           |                                                  | AFFF 6% Ultra          | KFP100ANC   | KFP100PNC  | 0.670                   | 17.01 | -                              | -     | -                              | -      | 50                             | 189   | 1,265                          | 4,789  |
|                           |                                                  | LS-xMax 3%             | KFP100ANN   | KFP100PNN  | 0.485                   | 12.32 | -                              | -     | -                              | -      | 46                             | 174   | 1,600                          | 6,057  |
| 6"<br>(DN150)             | 2"<br>NPT (ANSI)<br>or<br>BSP (PN16)<br>Thread   | Enviro USP 3%          | KFPF100ANL  | KFPF100PNL | 0.592                   | 13.44 | 370                            | 1,401 | 1,250                          | 4,732  | -                              | -     | -                              | -      |
|                           |                                                  |                        | KFP100ANL   | KFP100PNL  | 0.513                   | 13.03 | -                              | -     | -                              | -      | 420                            | 1,590 | 1,515                          | 5,734  |
|                           |                                                  | Enviro ARK 3%          | KFP100ANP   | KFP100PNP  | 0.513                   | 13.03 | 400                            | 1,514 | 1,350                          | 5,100  | -                              | -     | -                              | -      |
|                           |                                                  | AFFF 1% Ultra LT C6    | KFP150ANA   | KFP150PNA  | 0.358                   | 9.09  | 140                            | 530   | 2,300                          | 8,706  | 100                            | 378   | 2,300                          | 8,706  |
|                           |                                                  | AFFF 3% S C6           | KFP150ANB   | KFP150PNB  | 0.700                   | 17.78 | 70                             | 265   | 2,300                          | 8,706  | 50                             | 189   | 2,300                          | 8,706  |
|                           |                                                  | AFFF 3% M C6           | KFP150ANM   | KFP150PNM  | 0.700                   | 17.78 | 70                             | 265   | 2,300                          | 8,706  | 50                             | 189   | 2,300                          | 8,706  |
|                           |                                                  | ARC 3X3S C6            | KFP150ANJ   | KFP150PNJ  | 0.738                   | 18.75 | 750                            | 2,839 | 2,300                          | 8,706  | 750                            | 2,839 | 2,300                          | 8,706  |
|                           |                                                  | FP 3% C6               | KFP150ANK   | KFP150PNK  | 0.738                   | 18.75 | -                              | -     | -                              | -      | 152                            | 575   | 2,300                          | 8,706  |
| 8"<br>(DN200)             | 2.5"<br>NPT (ANSI)<br>or<br>BSP (PN16)<br>Thread | AFFF 6% Ultra          | KFP150ANC   | KFP150PNC  | 1.029                   | 26.14 | -                              | -     | -                              | -      | 200                            | 756   | 2,300                          | 8,706  |
|                           |                                                  | LS-xMax 3%             | KFP150ANN   | KFP150PNN  | 0.700                   | 17.78 | -                              | -     | -                              | -      | 99                             | 375   | 3,050                          | 11,546 |
|                           |                                                  | Enviro USP 3%          | KFP150ANL   | KFP150PNL  | 0.700                   | 17.78 | 845                            | 3,199 | 2,350                          | 8,896  | 990                            | 3,748 | 2,670                          | 10,105 |
|                           |                                                  | Enviro ARK 3%          | KFP150ANP   | KFP150PNP  | 0.700                   | 17.78 | 800                            | 3,028 | 2,400                          | 9,085  | -                              | -     | -                              | -      |
|                           |                                                  | AFFF 1% Ultra LT C6    | KFP200ANA   | KFP200PNA  | 0.525                   | 13.34 | 200                            | 756   | 4,500                          | 17,033 | 200                            | 756   | 4,500                          | 17,033 |
|                           |                                                  | AFFF 3% S C6           | KFP200ANB   | KFP200PNB  | 0.975                   | 24.77 | 70                             | 265   | 4,500                          | 17,033 | 70                             | 265   | 4,500                          | 17,033 |
|                           |                                                  | AFFF 3% M C6           | KFP200ANM   | KFP200PNM  | 0.975                   | 24.77 | 70                             | 265   | 4,500                          | 17,033 | 70                             | 265   | 4,500                          | 17,033 |
|                           |                                                  | ARC 3X3S C6            | KFP200ANJ   | KFP200PNJ  | 1.009                   | 25.63 | 1,400                          | 5,299 | 4,500                          | 17,033 | 1,400                          | 5,299 | 4,500                          | 17,033 |
|                           |                                                  | FP 3% C6               | KFP200ANK   | KFP200PNK  | 1.009                   | 25.63 | -                              | -     | -                              | -      | 256                            | 969   | 4,500                          | 17,033 |
|                           |                                                  | AFFF 6% Ultra          | KFP200ANC   | KFP200PNC  | 1.516                   | 39.62 | -                              | -     | -                              | -      | 346                            | 1,310 | 4,669                          | 17,674 |
|                           |                                                  | LS-xMax 3%             | KFP200ANN   | KFP200PNN  | 0.975                   | 24.77 | -                              | -     | -                              | -      | 242                            | 946   | 4,942                          | 19,305 |
|                           |                                                  | Enviro USP 3%          | KFP200ANL   | KFP200PNL  | 0.975                   | 24.77 | 2,010                          | 7,609 | 4,640                          | 17,564 | 2,000                          | 7,570 | 5,050                          | 19,114 |
|                           |                                                  | Enviro ARK 3%          | KFP200ANP   | KFP200PNP  | 0.975                   | 24.77 | 1,900                          | 7,192 | 4,640                          | 16,088 | -                              | -     | -                              | -      |

**NOTES:**
<sup>1</sup> Please refer to graphs in **section 7.2** for specific flow rate parameters.

<sup>2</sup> ANSI and PN16 flanges with Flat Face (FF) only.

<sup>3</sup> Relevant foam types comply with the requirements of the EPA 2010/2015 PFOA Stewardship Program.

Table 3.4.2 - Ordering information (Flanged connection)

**INFORMATION**

Some of the available options may be not covered by the UL Listing or FM Approval. Please always make reference to the appropriate approval directory or guides or contact KCA for further assistance.

## 4 Scope of delivery

Ensure that all components are complete and in good condition.

The ratio controller is supplied boxed, with data plate and an integral sized orifice disc specific to its approved/listed concentrate.

Grooved couplings are not included.

## 5 Availability

Please contact KCA for further information.

The product is available directly from KCA and official distributors only.

## 6 Product variants

### 6.1 Options

- Suitable for Fomtec foam concentrate: AFFF 1% Ultra LT C6 | AFFF 3% S C6 | AFFF 3% M C6 | ARC 3X3S C6 | FP 3% C6 | AFFF 6% Ultra | LS-xMax 3% | Enviro USP 3% | Enviro ARK 3% | Enviro AX1 1%
- Brass UNS C84400 construction available on special request (grooved only)
- Pre-assembled with bladder tank and water/foam pipe work

### 6.2 Dimensions and equivalent length

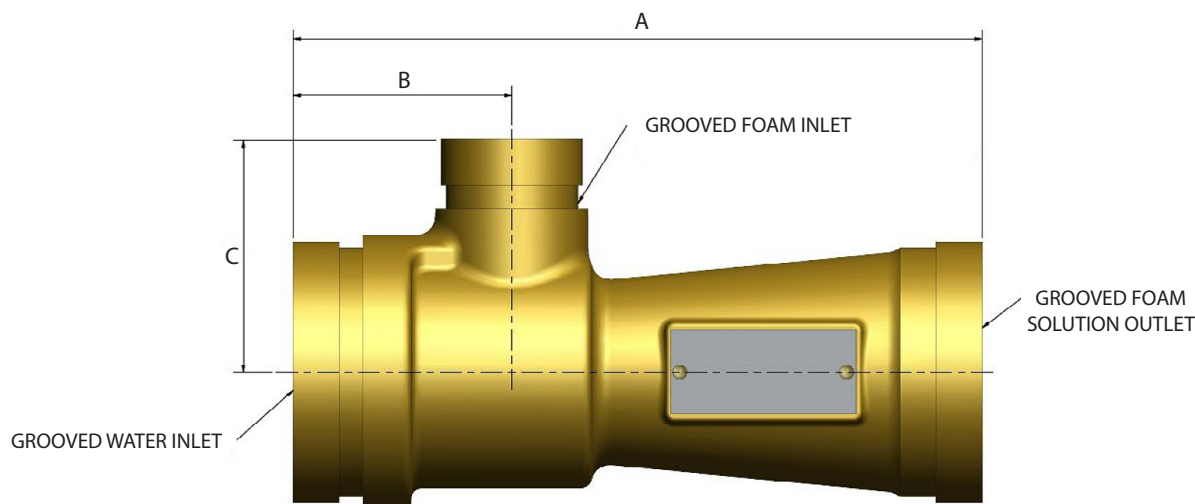


Figure 6.2.1 - Model KFP ratio controller (Grooved)

| Nominal size        | Equivalent length<br>(friction loss)* |       | Approximate weight |      | Approximate dimensions |     |         |    |         |     |                    |      |
|---------------------|---------------------------------------|-------|--------------------|------|------------------------|-----|---------|----|---------|-----|--------------------|------|
|                     |                                       |       | NAB version        |      | A                      |     | B       |    | C       |     | Grooved foam inlet |      |
|                     | Feet                                  | Metre | lbs                | kg   | Inch                   | mm  | Inch    | mm | Inch    | mm  | Inch               | mm   |
| 2" (DN50) Grooved   | 46                                    | 14.02 | 4.9                | 2.2  | 8-1/4                  | 210 | 3       | 76 | 2-9/16  | 65  | 1.5                | 48.3 |
| 2.5" (DN65) Grooved | 39                                    | 11.89 | 6.0                | 2.7  | 8-3/4                  | 222 | 2-15/16 | 75 | 2-13/16 | 71  | 1.5                | 48.3 |
| 3" (DN80) Grooved   | 31                                    | 9.45  | 8.6                | 3.9  | 9-1/4                  | 235 | 2-15/16 | 79 | 3-1/8   | 79  | 1.5                | 48.3 |
| 4" (DN100) Grooved  | 37                                    | 11.28 | 13.9               | 6.3  | 11                     | 279 | 3-5/16  | 84 | 3-9/16  | 91  | 2.0                | 60.3 |
| 6" (DN150) Grooved  | 88                                    | 26.82 | 30.6               | 13.9 | 15                     | 381 | 3-5/16  | 84 | 4-5/8   | 118 | 2.0                | 60.3 |
| 8" (DN200) Grooved  | 114                                   | 34.75 | 51.8               | 23.5 | 16-3/4                 | 426 | 3-11/16 | 94 | 5-5/8   | 143 | 2.5                | 76.1 |
| 8" (DN200) Grooved  | 114                                   | 34.75 | 51.8               | 23.5 | 16-3/4                 | 426 | 3-11/16 | 94 | 5-5/8   | 143 | 2.5                | 73.0 |

\* Expressed in equivalent length of schedule 40 pipe based on Hazen & Williams C=120

Table 6.2.2 - Equivalent length, weight & dimension data

## Foam Ratio Controller

Proportioning Devices | Model KFP

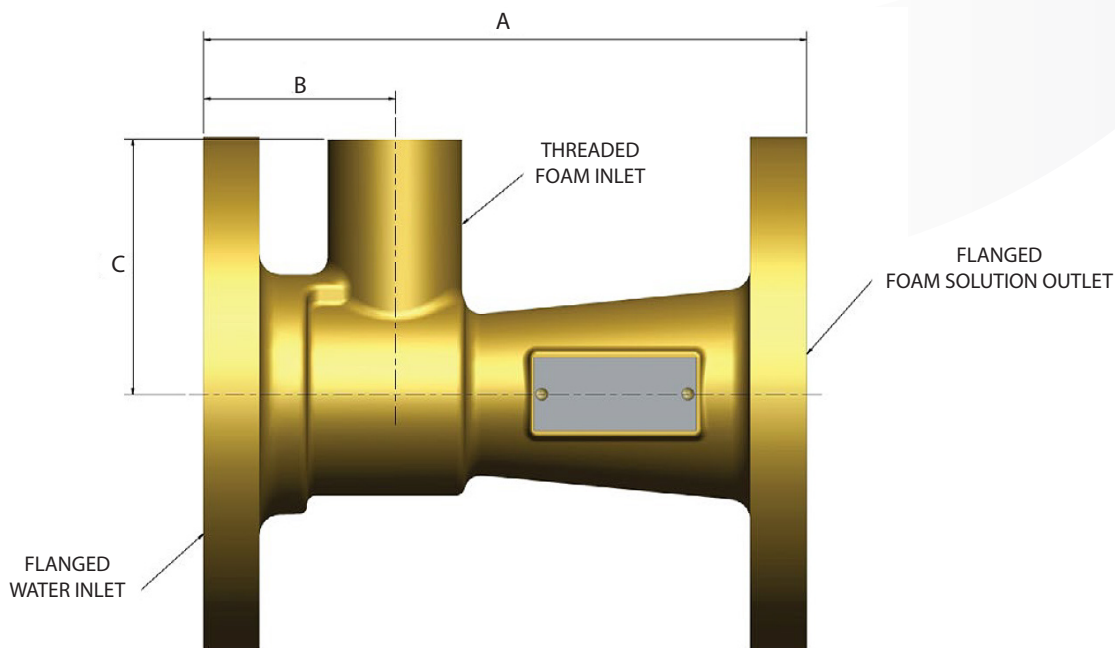


Figure 6.2.3 - Model KFP ratio controller (Flanged)

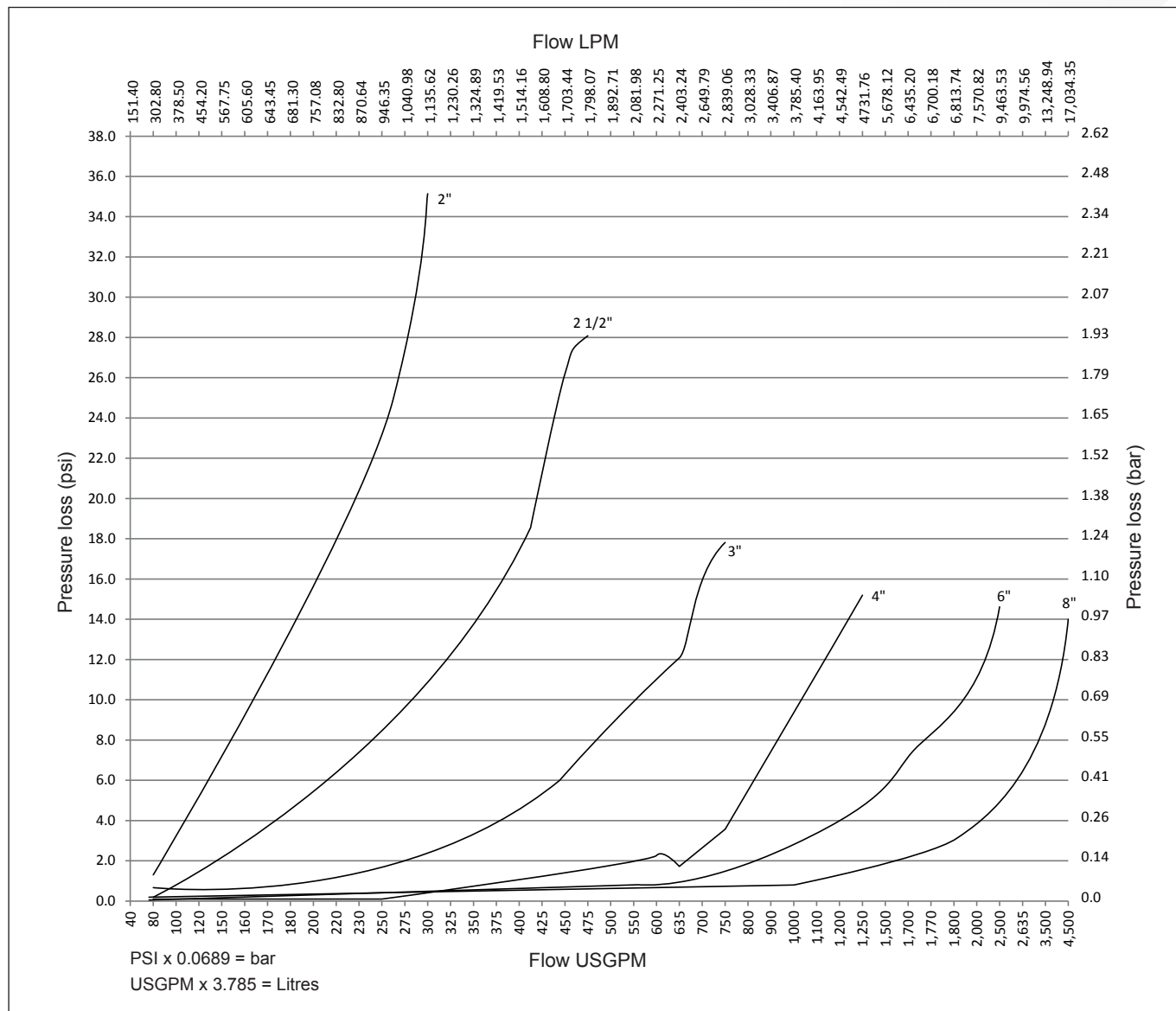
| Nominal size<br>(Water inlet/foam<br>solution outlet) | Equivalent<br>length<br>(friction loss)* |       | Approximate weight |      | Approximate dimensions |     |         |    |         |     |                        |     |
|-------------------------------------------------------|------------------------------------------|-------|--------------------|------|------------------------|-----|---------|----|---------|-----|------------------------|-----|
|                                                       |                                          |       | NAB version        |      | A                      |     | B       |    | C       |     | Threaded foam<br>inlet |     |
|                                                       | Feet                                     | Metre | lbs                | kg   | Inch                   | mm  | Inch    | mm | Inch    | mm  | Inch                   | mm  |
| 3" PN16                                               | 31                                       | 9.45  | 27.2               | 12.3 | 9-1/4                  | 235 | 2-15/16 | 79 | 3-15/16 | 100 | 1.5                    | BSP |
| 3" ANSI                                               | 31                                       | 9.45  | 27.4               | 12.4 | 9-1/4                  | 235 | 2-15/16 | 79 | 3-15/16 | 100 | 1.5                    | NPT |
| 4" PN16                                               | 37                                       | 11.28 | 36.7               | 16.6 | 11                     | 279 | 3-5/16  | 84 | 4-3/8   | 111 | 2                      | BSP |
| 4" ANSI                                               | 37                                       | 11.28 | 37.1               | 16.8 | 11                     | 279 | 3-5/16  | 84 | 4-3/8   | 111 | 2                      | NPT |
| 6" PN16                                               | 88                                       | 26.82 | 62.7               | 28.4 | 15                     | 381 | 3-5/16  | 84 | 5-7/16  | 138 | 2                      | BSP |
| 6" ANSI                                               | 88                                       | 26.82 | 63.2               | 28.6 | 15                     | 381 | 3-5/16  | 84 | 5-7/16  | 138 | 2                      | NPT |
| 8" PN16                                               | 114                                      | 34.75 | 98.9               | 44.8 | 16-3/4                 | 426 | 3-11/16 | 94 | 6-11/16 | 170 | 2.5                    | BSP |
| 8" ANSI                                               | 114                                      | 34.75 | 99.6               | 45.1 | 16-3/4                 | 426 | 3-11/16 | 94 | 6-11/16 | 170 | 2.5                    | NPT |

\* Expressed in equivalent length of schedule 40 pipe based on Hazen & Williams C=120

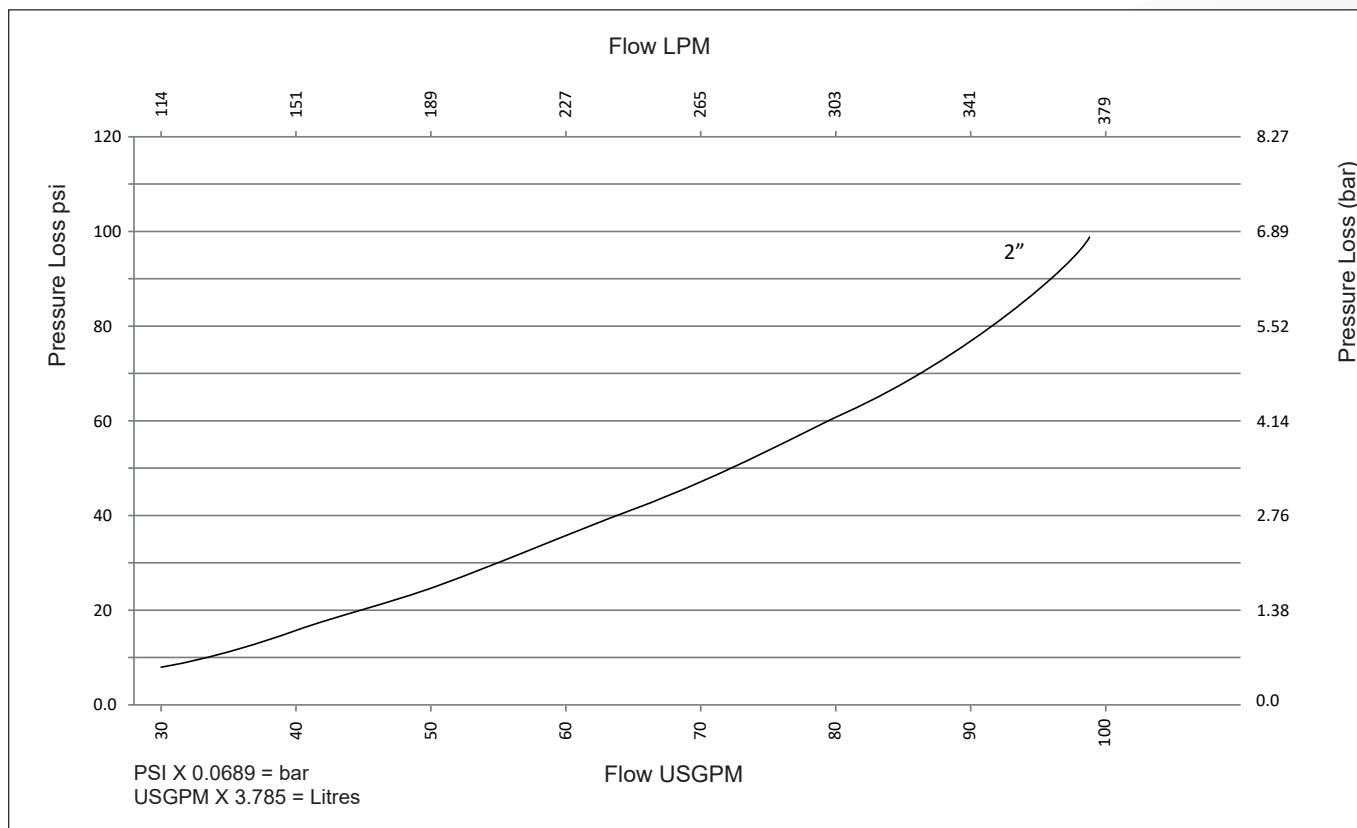
Figure 6.2.4 - Equivalent length, weight & dimension data

## 7 Performance data

### 7.1 Friction loss vs. foam solution flow



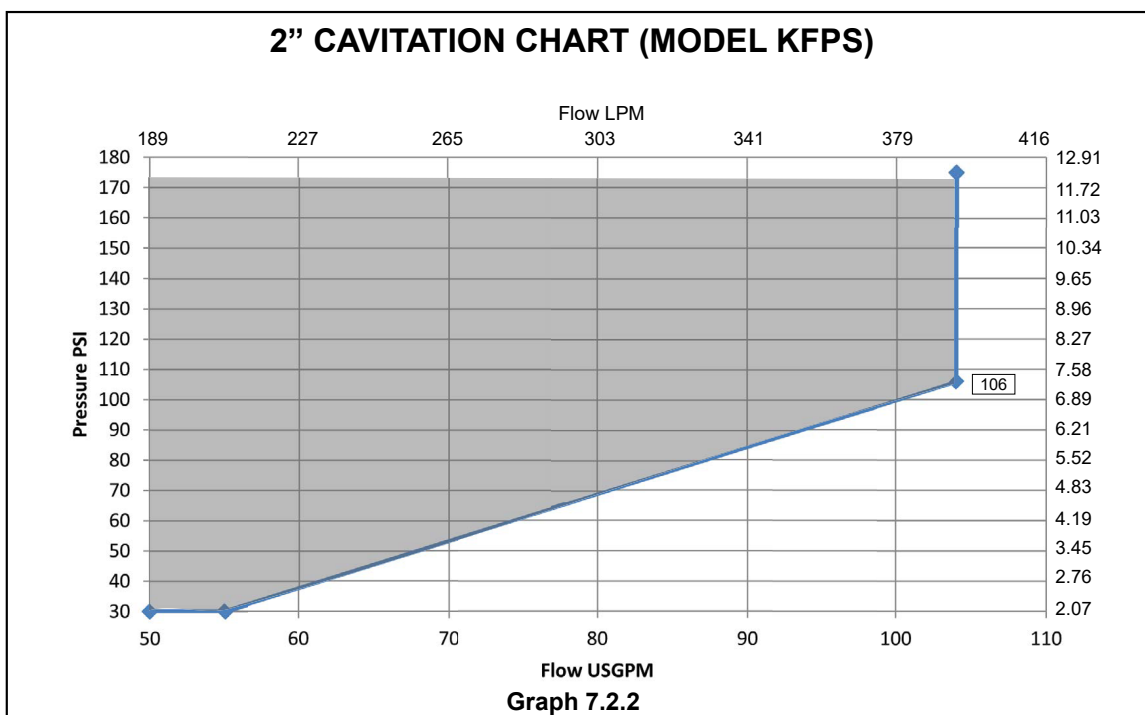
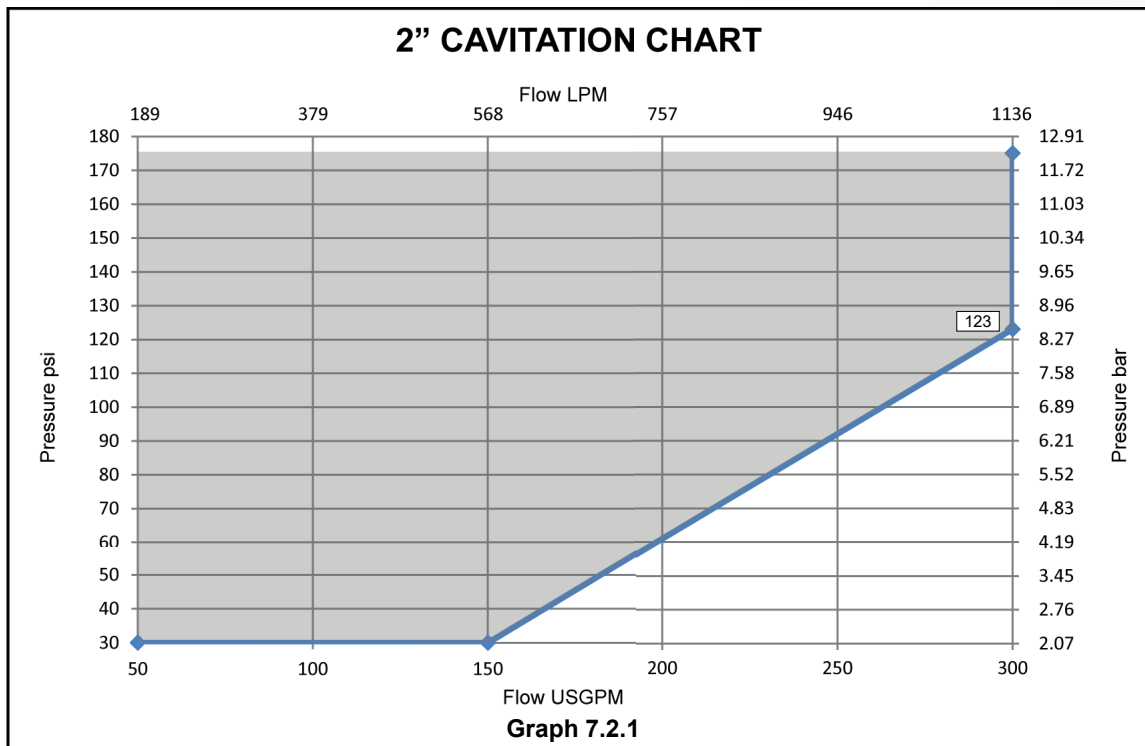
Graph 7.1.1 - Friction loss vs. foam solution flow

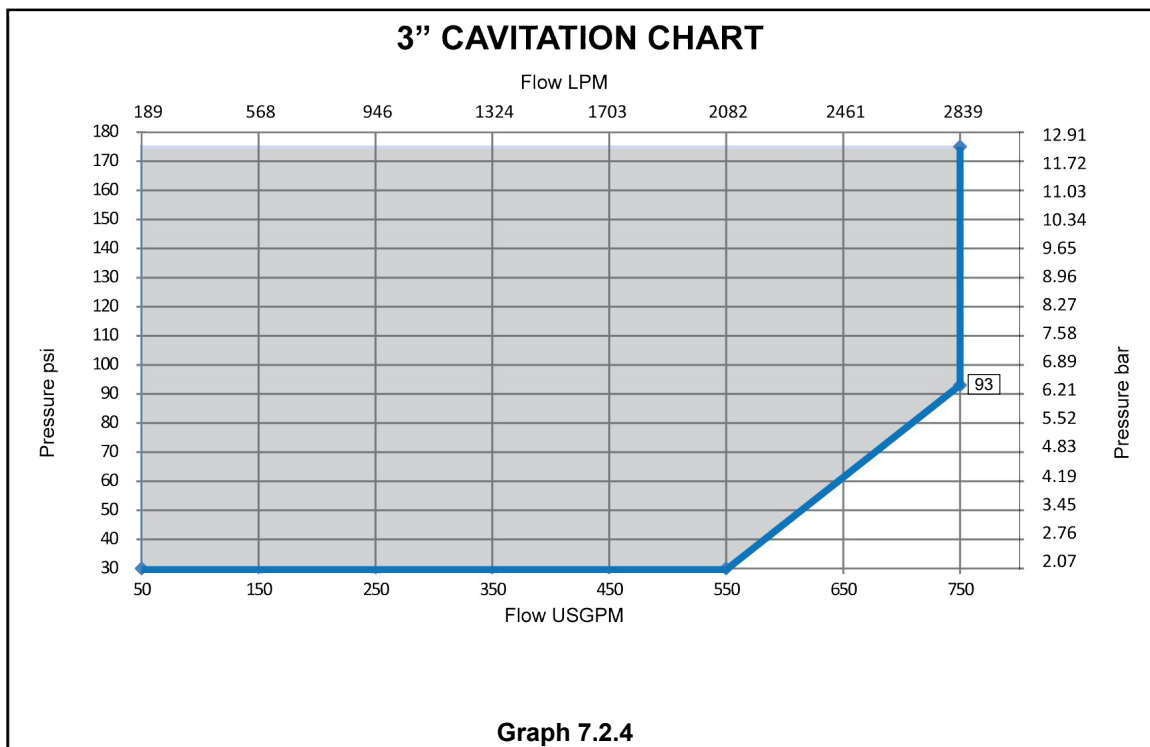
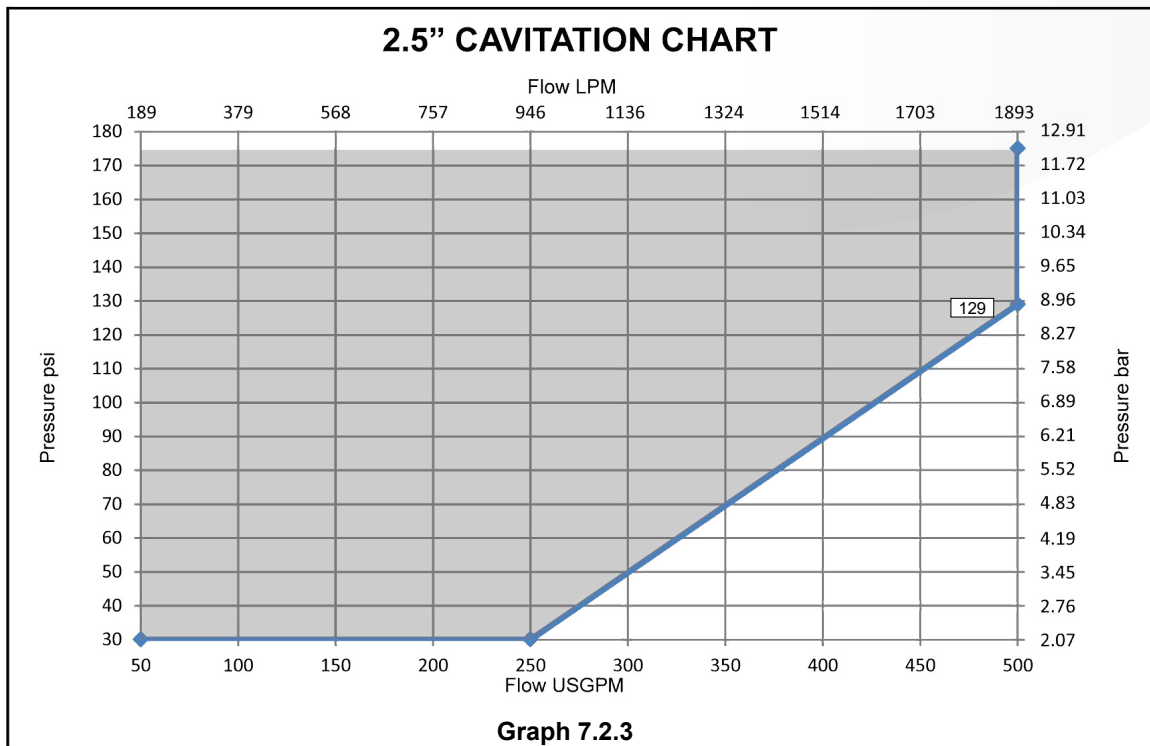


Graph 7.1.2 - Friction Loss vs Foam Solution Flow (2" Model VRCS)

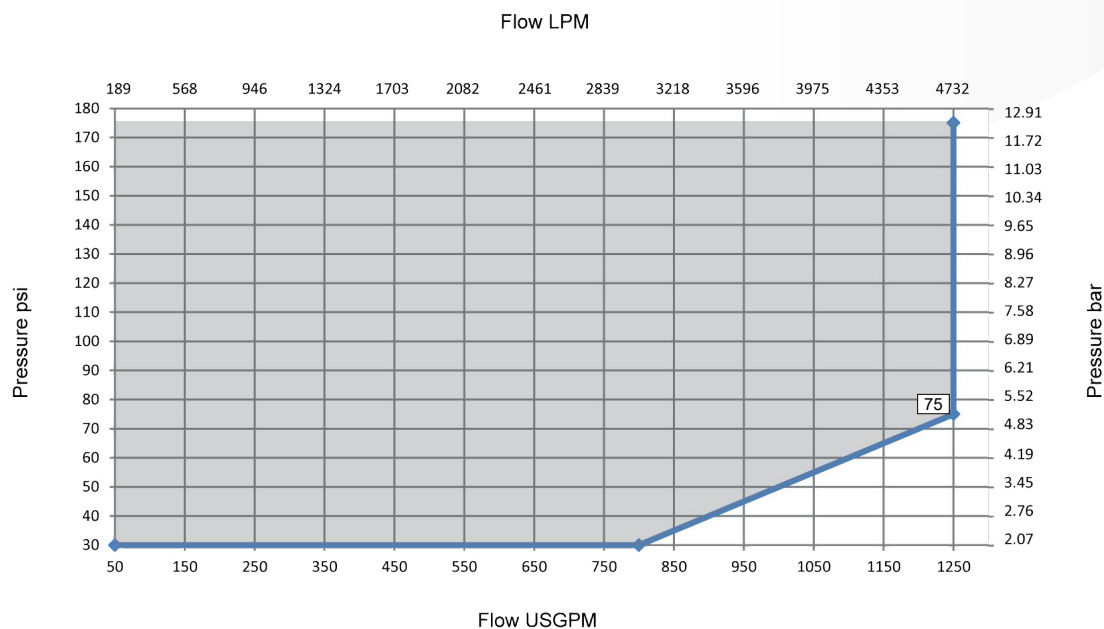
## 7.2 Inlet pressure vs. foam solution flow

Ratio controller must be used within the shaded flow and pressure conditions.



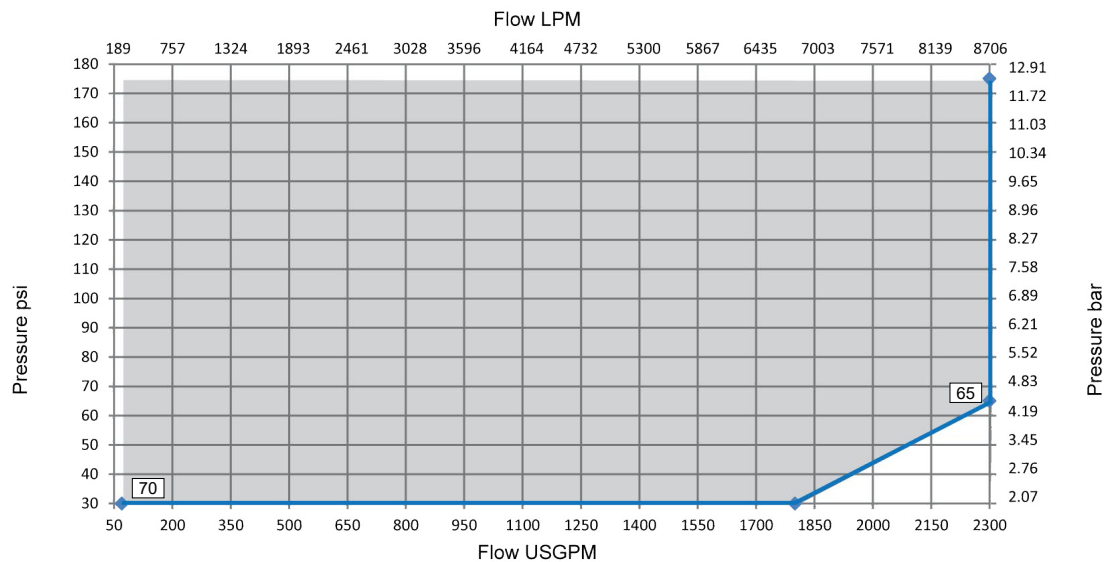


## 4" CAVITATION CHART

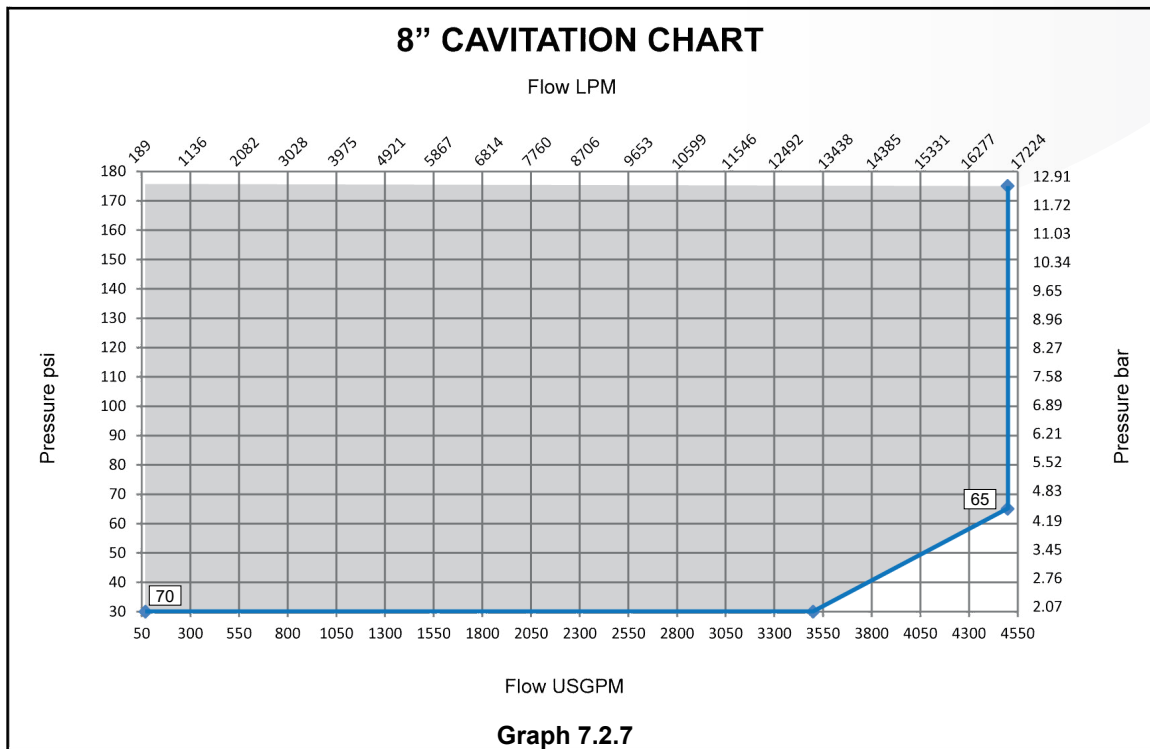


Graph 7.2.5

## 6" CAVITATION CHART



Graph 7.2.6



## 8 Installation

Refer to appropriate Installation Standards (i.e. NFPA, VdS, LPCB, etc.) and / or applicable FM Global Property Loss Prevention Data Sheets such as 4-12, Foam-Water Sprinkler Systems. In addition, the "Authority Having Jurisdiction" (AHJ) may have additional installation requirements that must be followed.

Do not alter the piping without consulting a system design representative.

Before installing a ratio controller, check the system design drawing to ensure the controller location does not create excessive head pressure or frictional losses.

- a) The ratio controller must be installed with the arrow pointing in the direction of the water flow.
- b) The ratio controller can be installed in the vertical or horizontal position.
- c) Straight piping equal to a minimum of five (5) pipe diameters should be installed before and after the ratio controller to help ensure proportioning accuracy. This includes the proportioning test connection which is best installed further downstream after changes in pipe direction which helps to ensure a better mixing of foam solution.
- d) In dry, deluge and preaction systems a removable section of pipe should be installed between the concentrate control valve and ratio controller foam inlet to allow the flushing of foam concentrate after system activation.
- e) The ideal location for the controller is level or below the top discharge and within 3 feet (1 m) of the tank..
- f) The pressure drop within the piping to the bladder tank water or foam concentrate piping can be minimized by:
  - 1) Limiting the number of tees and elbows used
  - 2) Using full port valves
  - 3) Increasing the pipe diameter
- g) The combined total equivalent length of pipe (pipe length, plus equivalent lengths for fittings and valves), including both the water supply inlet piping and the foam concentrate discharge piping, should not exceed 165 equivalent feet (50.3 meters); specifically, 100' (30.5 m) water supply and 65' (19.8 m) foam concentrate piping.
- h) The foam concentrate line should run as directly as possible from the bladder tank outlet to the ratio controller and avoid excessive changes in elevation.
- i) The diameter of this piping must be the same size or larger than the foam concentrate inlet into the ratio controller.
- j) Installation of a concentrate control valve (CCV) is highly recommended to prevent unintentional migration of foam from the bladder tank.
- k) Install a suitable check valve between the bladder tank and ratio controller to prevent system water flowing back to the bladder tank. This should be installed close to the ratio controller foam inlet connection.
- l) Care should be taken to ensure that the bladder tank and foam concentrate line are vented of trapped air to assist proportioning performance.

## 9 Operation

The ratio controller is a modified venturi device. As water flows through the calibrated water nozzle, it creates an area of lower pressure, referred to as the metering pressure drop. As the water flow increases through the venturi, the metering pressure drop increases, allowing more foam concentrate to enter through the sized foam orifice. A decrease in the water flow reduces the metering pressure drop, thereby reducing the foam concentrate flow.

Because the foam concentrate flow changes in direct proportion to the water flow, the ratio controller can accurately proportion foam concentrate over a wide range of water flow rates.

The flow rate at which the metering pressure drop is just high enough to overcome the pressure losses through the bladder tank and its piping, is called the low flow rating. The water flow rate through the ratio controller must be at or above its low flow rating in order to properly proportion foam concentrate.

## 10 Guarantee

For details of warranty, refer to KCA's current list price schedule or contact KCA directly.

## 11 Inspection, tests and maintenance

Refer to respective requirements, according to the relevant standards for inspection, testing and maintenance.

## Foam Ratio Controller

Proportioning Devices | Model KFP

If applicable, refer to FM Global Property Loss Prevention Datasheet 4-12 for specific test and commissioning criteria. In addition, the "Authority Having Jurisdiction" (AHJ) may have additional maintenance, testing and inspection requirements that must be followed.



*Any system maintenance or testing that involves placing a control valve or detection system out of service may eliminate the fire protection of that system. Prior to proceeding, notify all Authorities Having Jurisdiction. Consideration should be given to employment of a fire patrol in the affected area.*

### 12 Disposal

At end of use the product described here should be disposed of via the national recycling system.



### 13 Accessories and spare parts

None

### 14 Declaration of conformity

If required, contact KCA for further assistance.