

# FF

## Extra-Wide Angle

### DESIGN FEATURES

- One-piece construction
- Clog resistant
- Durable
- All 3/8" FFs in Brass are available with UL approval
- Male connection

### SPRAY CHARACTERISTICS

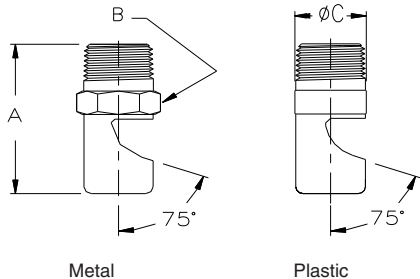
- Extra-wide 145° spray angle
  - Medium-impact spray
  - Spray discharge deflected 75° from inlet axis
  - Coarse atomization
- Spray pattern:** Flat Fan  
**Spray angle:** 105° or 145°, as listed  
**Flow rates:** 0.510 to 757 l/min



Plastic



Fan 145°



Metal

Plastic

Dimensions are approximate. Check with BETE for critical dimension applications.

### FF Flow Rates

Fan, 105° and 145° Spray Angle, 1/8" to 1" Pipe Sizes, BSP or NPT

| Male Pipe Size   | Nozzle Number | Spray Angle | K Factor | LITERS PER MINUTE @ BAR |         |         |       |       |       |       |        | Approx. Orifice Dia. (mm) |
|------------------|---------------|-------------|----------|-------------------------|---------|---------|-------|-------|-------|-------|--------|---------------------------|
|                  |               |             |          | 0.2 bar                 | 0.5 bar | 0.7 bar | 1 bar | 2 bar | 3 bar | 5 bar | 10 bar |                           |
| 1/8              | FF016         | 105°        | 0.114    | 0.0510                  | 0.0806  | 0.0953  | 0.114 | 0.161 | 0.197 | 0.255 | 0.360  | 0.406                     |
|                  | FF024         | 105°        | 0.228    | 0.102                   | 0.161   | 0.191   | 0.228 | 0.322 | 0.395 | 0.510 | 0.721  | 0.610                     |
|                  | FF028         | 105°        | 0.342    | 0.153                   | 0.242   | 0.286   | 0.342 | 0.483 | 0.592 | 0.764 | 1.08   | 0.711                     |
|                  | FF033         | 105°        | 0.456    | 0.204                   | 0.322   | 0.381   | 0.456 | 0.645 | 0.789 | 1.02  | 1.44   | 0.838                     |
|                  | FF041         | 145°        | 0.684    | 0.306                   | 0.483   | 0.572   | 0.684 | 0.967 | 1.18  | 1.53  | 2.16   | 1.04                      |
|                  | FF046         | 145°        | 0.912    | 0.408                   | 0.645   | 0.763   | 0.912 | 1.29  | 1.58  | 2.04  | 2.88   | 1.17                      |
|                  | FF052         | 145°        | 1.14     | 0.510                   | 0.806   | 0.953   | 1.14  | 1.61  | 1.97  | 2.55  | 3.60   | 1.32                      |
|                  | FF057         | 145°        | 1.37     | 0.611                   | 0.967   | 1.14    | 1.37  | 1.93  | 2.37  | 3.06  | 4.32   | 1.45                      |
| 1/8<br>or<br>1/4 | FF065         | 145°        | 1.82     | 0.815                   | 1.29    | 1.53    | 1.82  | 2.58  | 3.16  | 4.08  | 5.77   | 1.65                      |
|                  | FF073         | 145°        | 2.28     | 1.02                    | 1.61    | 1.91    | 2.28  | 3.22  | 3.95  | 5.10  | 7.21   | 1.85                      |
|                  | FF093         | 145°        | 3.42     | 1.53                    | 2.42    | 2.86    | 3.42  | 4.83  | 5.92  | 7.64  | 10.8   | 2.36                      |
|                  | FF104         | 145°        | 4.56     | 2.04                    | 3.22    | 3.81    | 4.56  | 6.45  | 7.89  | 10.2  | 14.4   | 2.64                      |
|                  | FF116         | 145°        | 5.47     | 2.45                    | 3.87    | 4.58    | 5.47  | 7.73  | 9.47  | 12.2  | 17.3   | 2.95                      |
|                  | FF125         | 145°        | 5.70     | 2.55                    | 4.03    | 4.77    | 5.70  | 8.06  | 9.87  | 12.7  | 18.0   | 3.18                      |
|                  | FF129         | 145°        | 6.84     | 3.06                    | 4.83    | 5.72    | 6.84  | 9.67  | 11.8  | 15.3  | 21.6   | 3.28                      |
|                  | FF141         | 145°        | 8.20     | 3.67                    | 5.80    | 6.86    | 8.20  | 11.6  | 14.2  | 18.3  | 25.9   | 3.58                      |
| FF148            | 145°          | 9.12        | 4.08     | 6.45                    | 7.63    | 9.12    | 12.9  | 15.8  | 20.4  | 28.8  | 3.76   |                           |
| 1/4              | FF156         | 145°        | 10.0     | 4.48                    | 7.09    | 8.39    | 10.0  | 14.2  | 17.4  | 22.4  | 31.7   | 3.96                      |
|                  | FF161         | 145°        | 10.9     | 4.89                    | 7.73    | 9.15    | 10.9  | 15.5  | 18.9  | 24.5  | 34.6   | 4.09                      |
|                  | FF173         | 145°        | 12.3     | 5.50                    | 8.70    | 10.3    | 12.3  | 17.4  | 21.3  | 27.5  | 38.9   | 4.39                      |

### FF Dimensions

Dimensions

| Pipe Size | Dim. (mm) |      |      | Wt. (g) |     |
|-----------|-----------|------|------|---------|-----|
|           | A         | B    | C    | M       | P   |
| 1/8       | 25.4      | 11.2 | 12.7 | 14      | 3   |
| 1/4       | 35.1      | 14.2 | 16.0 | 35      | 7.5 |

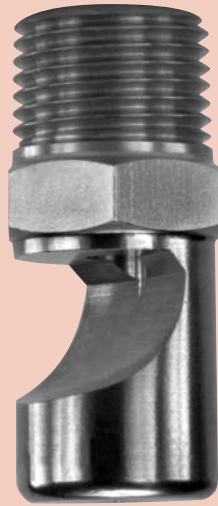
$$\text{Flow Rate (l/min)} = K \sqrt{\text{bar}}$$

**Standard Materials:** Brass, 303 Stainless Steel, 316 Stainless Steel, PVC, and PTFE

(PTFE and PVC not available in nozzles FF016 to FF028; PTFE not available in nozzles FF033 to FF065).

Spray angle performance varies with pressure. Contact BETE for specific data on critical applications.

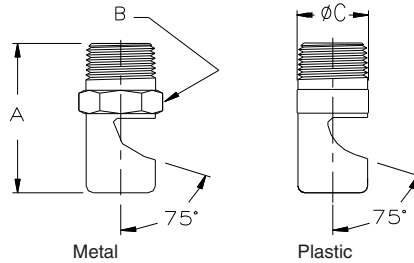
TO ORDER: specify pipe size, connection type, nozzle number, spray angle, and material.



Metal



All 3/8" FFs in Brass have UL approval



Dimensions are approximate. Check with BETE for critical dimension applications.

| FF Flow Rates   |               |             |          |                         |         |         |       |       |       |       |        | FF Dimensions            |           |           |      |      |         |     |
|---|---------------|-------------|----------|-------------------------|---------|---------|-------|-------|-------|-------|--------|--------------------------|-----------|-----------|------|------|---------|-----|
| Fan, 105° and 145° Spray Angle, 1/8" to 1" Pipe Sizes, BSP or NPT |               |             |          |                         |         |         |       |       |       |       |        |                          |           |           |      |      |         |     |
| Male Pipe Size  | Nozzle Number | Spray Angle | K Factor | LITERS PER MINUTE @ BAR |         |         |       |       |       |       |        | Approx. Orifice Dia (mm) | Pipe Size | Dim. (mm) |      |      | Wt. (g) |     |
|   |               |             |          | 0.2 bar                 | 0.5 bar | 0.7 bar | 1 bar | 2 bar | 3 bar | 5 bar | 10 bar |                          |           | A         | B    | C    | M       | P   |
| 3/8   | FF187         | 145°        | 13.7     | 6.11                    | 9.67    | 11.4    | 13.7  | 19.3  | 23.7  | 30.6  | 43.2   | 4.75                     | 3/8       | 44.5      | 17.5 | 19.1 | 72      | 15  |
|   | FF196         | 145°        | 16.0     | 7.1                     | 11.3    | 13.3    | 16.0  | 22.6  | 27.6  | 35.7  | 50.4   | 4.98                     |           |           |      |      |         |     |
|   | FF209         | 145°        | 17.0     | 7.6                     | 12.0    | 14.2    | 17.0  | 24.0  | 29.4  | 38.0  | 53.8   | 5.31                     |           |           |      |      |         |     |
|   | FF218         | 145°        | 18.2     | 8.2                     | 12.9    | 15.3    | 18.2  | 25.8  | 31.6  | 40.8  | 57.7   | 5.54                     |           |           |      |      |         |     |
|   | FF221         | 145°        | 20.5     | 9.2                     | 14.5    | 17.2    | 20.5  | 29.0  | 35.5  | 45.9  | 64.9   | 5.61                     |           |           |      |      |         |     |
| 1/2   | FF209         | 145°        | 17.0     | 7.6                     | 12.0    | 14.2    | 17.0  | 24.0  | 29.4  | 38.0  | 53.8   | 5.31                     | 1/2       | 50.8      | 22.4 | 22.4 | 117     | 25  |
|   | FF218         | 145°        | 18.2     | 8.2                     | 12.9    | 15.3    | 18.2  | 25.8  | 31.6  | 40.8  | 57.7   | 5.54                     |           |           |      |      |         |     |
|   | FF250         | 145°        | 23.9     | 10.7                    | 16.9    | 20.0    | 23.9  | 33.8  | 41.4  | 53.5  | 75.7   | 6.35                     |           |           |      |      |         |     |
|   | FF256         | 145°        | 27.3     | 12.2                    | 19.3    | 22.9    | 27.3  | 38.7  | 47.4  | 61.1  | 86.5   | 6.55                     |           |           |      |      |         |     |
|   | FF281         | 145°        | 31.9     | 14.3                    | 22.6    | 26.7    | 31.9  | 45.1  | 55.3  | 71.3  | 101    | 7.14                     |           |           |      |      |         |     |
|   | FF312         | 145°        | 36.5     | 16.3                    | 25.8    | 30.5    | 36.5  | 51.6  | 63.2  | 81.5  | 115    | 7.92                     |           |           |      |      |         |     |
|   | FF375         | 145°        | 54.7     | 24.5                    | 38.7    | 45.8    | 54.7  | 77.3  | 94.7  | 122   | 173    | 9.53                     |           |           |      |      |         |     |
| 3/4   | FF316         | 145°        | 41.0     | 18.3                    | 29.0    | 34.3    | 41.0  | 58.0  | 71.0  | 92    | 130    | 8.03                     | 3/4       | 66.8      | 38.1 | 38.1 | 345     | 73  |
|   | FF332         | 145°        | 45.6     | 20.4                    | 32.2    | 38.1    | 45.6  | 64.5  | 78.9  | 102   | 144    | 8.43                     |           |           |      |      |         |     |
|   | FF348         | 145°        | 50.1     | 22.4                    | 35.5    | 41.9    | 50.1  | 70.9  | 86.8  | 112   | 159    | 8.84                     |           |           |      |      |         |     |
|   | FF368         | 145°        | 54.7     | 24.5                    | 38.7    | 45.8    | 54.7  | 77.3  | 94.7  | 122   | 173    | 9.35                     |           |           |      |      |         |     |
|   | FF375         | 145°        | 54.7     | 24.5                    | 38.7    | 45.8    | 54.7  | 77.3  | 94.7  | 122   | 173    | 9.53                     |           |           |      |      |         |     |
|   | FF406         | 145°        | 63.8     | 28.5                    | 45.1    | 53.4    | 63.8  | 90.2  | 111   | 143   | 202    | 10.3                     |           |           |      |      |         |     |
|   | FF437         | 145°        | 72.9     | 32.6                    | 51.6    | 61.0    | 72.9  | 103   | 126   | 163   | 231    | 11.1                     |           |           |      |      |         |     |
|   | FF453         | 145°        | 82.0     | 36.7                    | 58.0    | 68.6    | 82.0  | 116   | 142   | 183   | 259    | 11.5                     |           |           |      |      |         |     |
|   | FF484         | 145°        | 95.7     | 42.8                    | 67.7    | 80.1    | 95.7  | 135   | 166   | 214   | 303    | 12.3                     |           |           |      |      |         |     |
|   | FF500         | 145°        | 109      | 48.9                    | 77.3    | 91.5    | 109   | 155   | 189   | 245   | 346    | 12.7                     |           |           |      |      |         |     |
| 1   | FF578         | 145°        | 137      | 61.1                    | 96.7    | 114     | 137   | 193   | 237   | 306   | 432    | 14.7                     | 1         | 85.9      | 50.8 | 50.8 | 908     | 192 |
|   | FF625         | 145°        | 166      | 74.4                    | 118     | 139     | 166   | 235   | 288   | 372   | 526    | 15.9                     |           |           |      |      |         |     |
|   | FF703         | 145°        | 205      | 91.7                    | 145     | 172     | 205   | 290   | 355   | 459   | 649    | 17.9                     |           |           |      |      |         |     |
|   | FF750         | 145°        | 239      | 107                     | 169     | 200     | 239   | 338   | 414   | 535   | 757    | 19.1                     |           |           |      |      |         |     |

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Standard Materials: Brass, 303 Stainless Steel, 316 Stainless Steel, PVC, and PTFE.

Spray angle performance varies with pressure. Contact BETE for specific data on critical applications.