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## SECTION 1

### Standard Malleable Pipe Fittings Class 150



#### Pressure / Temperature Ratings

| Temp F°    | PSI |
|------------|-----|
| -20 TO 150 | 300 |
| 200        | 265 |
| 250        | 225 |
| 300        | 185 |
| 350        | 150 |
| 366        | 150 |

**Ward Class 150 Malleable Iron Fittings** are made with the most sophisticated metallurgical and processing controls available. Iron samples are continuously analyzed using spectroscopy to conform the material quality. This sophisticated chemical analysis is complemented by rigorous quality control of incoming raw materials and iron processing. The final casting produced by this detailed attention to quality is a close-grained, high strength, non-porous iron.

Quality iron is the starting point for Ward fittings. From this iron, accurate threads are machined that comply with the precise standards developed by the American Society of Mechanical Engineers (ASME) and published as an American National Standard. The threads have an accurate form, thread length and straightness to allow them to easily engage threaded pipe. In addition, Ward fittings have a chamfered opening to allow faster and easier pipe engagement. This feature also protects the fitting threads from damage during handling.

All Ward black & galvanized Class 150 Malleable Iron Fittings having outlets ranging from 1/2" through 4" are air tested at 80 psig. This test is part of a constant program to maintain the highest quality fittings available.

#### General Dimensions / In Inches

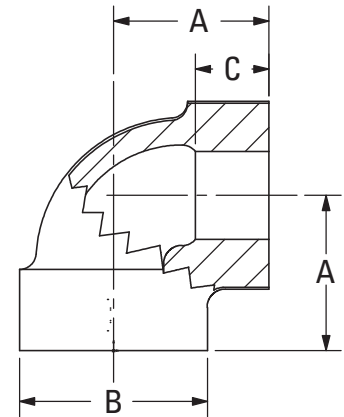
These dimensions apply to all standard malleable banded fittings, both straight and reducing. Length of thread also applies to plain fittings. For center-to-face dimensions, see fittings tables.

| NPS   | O.D. of Band (min) | Thread Length (min) |
|-------|--------------------|---------------------|
| 1/8   | 0.69               | 0.25                |
| 1/4   | 0.84               | 0.32                |
| 3/8   | 1.01               | 0.36                |
| 1/2   | 1.20               | 0.43                |
| 3/4   | 1.46               | 0.50                |
| 1     | 1.77               | 0.58                |
| 1 1/4 | 2.15               | 0.67                |
| 1 1/2 | 2.43               | 0.70                |
| 2     | 2.96               | 0.75                |
| 2 1/2 | 3.59               | 0.92                |
| 3     | 4.28               | 0.98                |
| 3 1/2 | 4.84               | 1.03                |
| 4     | 5.40               | 1.08                |

|                                   |                                                            |
|-----------------------------------|------------------------------------------------------------|
| <b>Material:</b>                  | ASTM A197                                                  |
| <b>Dimensions:</b>                | ASME B16.3<br>ANSI/ASME B1.20.1                            |
| <b>Pressure Ratings:</b>          | ASME B16.3                                                 |
| <b>Coatings:</b>                  | ASTM A153<br>ASTM B633                                     |
| <b>Additional Specifications:</b> | UL, ULC, FM, NSF 61 and<br>NSF 61 Annex G where applicable |

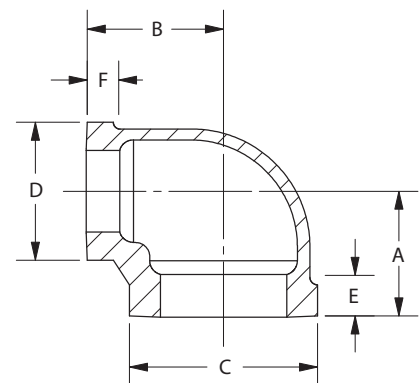
## MALLEABLE IRON 90° STRAIGHT ELL CLASS 150

| NPS   | Center to End A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|-----------------|------------------------------|---------------------------|----------|
| 1/8   | 0.69            | 0.69                         | 0.25                      | 0.42     |
| 1/4   | 0.81            | 0.84                         | 0.32                      | 0.40     |
| 3/8   | 0.95            | 1.01                         | 0.36                      | 0.54     |
| 1/2   | 1.12            | 1.20                         | 0.43                      | 0.58     |
| 3/4   | 1.31            | 1.46                         | 0.50                      | 0.76     |
| 1     | 1.50            | 1.77                         | 0.58                      | 0.81     |
| 1 1/4 | 1.75            | 2.15                         | 0.67                      | 1.04     |
| 1 1/2 | 1.94            | 2.43                         | 0.70                      | 1.21     |
| 2     | 2.25            | 2.96                         | 0.75                      | 1.49     |
| 2 1/2 | 2.70            | 3.59                         | 0.92                      | 1.56     |
| 3     | 3.08            | 4.28                         | 0.98                      | 1.88     |
| 3 1/2 | —               | —                            | —                         | —        |
| 4     | 3.79            | 5.40                         | 1.08                      | 2.49     |
| 5     | —               | —                            | —                         | —        |
| 6     | 5.13            | 7.77                         | 1.28                      | 3.61     |



## MALLEABLE IRON REDUCING 90° ELL CLASS 150

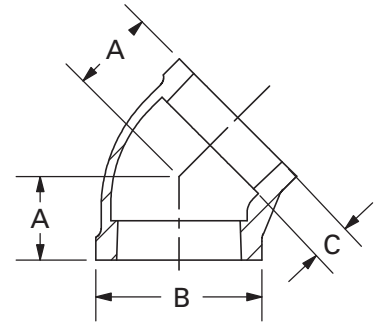
| NPS           | Center to End A | Center to End B | Outside Dia. of Band C (min) | Outside Dia. of Band D (min) | Length of Threads E (min) | Length of Threads F (min) | Take Out | Take Out |
|---------------|-----------------|-----------------|------------------------------|------------------------------|---------------------------|---------------------------|----------|----------|
| 1/4 x 1/8     | 0.74            | 0.76            | 0.84                         | 0.69                         | 0.32                      | 0.25                      | 0.33     | 0.49     |
| 3/8 x 1/4     | 0.88            | 0.90            | 1.01                         | 0.84                         | 0.36                      | 0.32                      | 0.47     | 0.49     |
| 3/8 x 1/8     | —               | —               | —                            | —                            | —                         | —                         | —        | —        |
| 1/2 x 3/8     | 1.04            | 1.03            | 1.20                         | 1.01                         | 0.43                      | 0.36                      | 0.50     | 0.62     |
| 1/2 x 1/4     | 0.97            | 0.98            | 1.20                         | 0.84                         | 0.43                      | 0.32                      | 0.43     | 0.57     |
| 3/4 x 1/2     | 1.20            | 1.22            | 1.46                         | 1.20                         | 0.50                      | 0.43                      | 0.65     | 0.68     |
| 3/4 x 3/8     | 1.12            | 1.13            | 1.46                         | 1.01                         | 0.50                      | 0.36                      | 0.57     | 0.72     |
| 3/4 x 1/4     | —               | —               | —                            | —                            | —                         | —                         | —        | —        |
| 1 x 3/4       | 1.37            | 1.45            | 1.77                         | 1.46                         | 0.58                      | 0.50                      | 0.68     | 0.90     |
| 1 x 1/2       | 1.26            | 1.36            | 1.77                         | 1.20                         | 0.58                      | 0.43                      | 0.57     | 0.82     |
| 1 x 3/8       | 1.18            | 1.27            | 1.77                         | 1.01                         | 0.58                      | 0.36                      | 0.49     | 0.86     |
| 1 1/4 x 1     | 1.58            | 1.67            | 2.15                         | 1.77                         | 0.67                      | 0.58                      | 0.87     | 0.98     |
| 1 1/4 x 3/4   | 1.45            | 1.62            | 2.15                         | 1.46                         | 0.67                      | 0.50                      | 0.74     | 1.07     |
| 1 1/4 x 1/2   | 1.34            | 1.53            | 2.15                         | 1.20                         | 0.67                      | 0.43                      | 0.63     | 0.99     |
| 1 1/2 x 1 1/4 | 1.82            | 1.88            | 2.43                         | 2.15                         | 0.70                      | 0.67                      | 1.09     | 1.47     |
| 1 1/2 x 1     | 1.65            | 1.80            | 2.43                         | 1.77                         | 0.70                      | 0.58                      | 0.92     | 1.11     |
| 1 1/2 x 3/4   | 1.52            | 1.75            | 2.43                         | 1.46                         | 0.70                      | 0.50                      | 0.79     | 1.20     |
| *1 1/2 x 1/2  | 1.41            | 1.66            | 2.43                         | 1.20                         | 0.70                      | 0.43                      | 0.68     | 1.12     |
| 2 x 1 1/2     | 2.02            | 2.16            | 2.96                         | 2.43                         | 0.75                      | 0.70                      | 1.26     | 1.626    |
| 2 x 1 1/4     | 1.90            | 2.10            | 2.96                         | 2.15                         | 0.75                      | 0.67                      | 1.14     | 1.69     |
| 2 x 1         | 1.73            | 2.02            | 2.96                         | 1.77                         | 0.75                      | 0.58                      | 0.97     | 1.33     |
| 2 x 3/4       | 1.60            | 1.97            | 2.96                         | 1.46                         | 0.75                      | 0.50                      | 0.84     | 1.42     |
| *2 x 1/2      | 1.49            | 1.88            | 2.96                         | 1.20                         | 0.75                      | 0.43                      | 0.73     | 1.34     |
| 2 1/2 x 2     | 2.39            | 2.60            | 3.59                         | 2.96                         | 0.92                      | 0.75                      | 1.25     | 1.84     |
| 2 1/2 x 1 1/2 | 2.16            | 2.51            | 3.59                         | 2.43                         | 0.92                      | 0.70                      | 1.02     | 1.78     |
| 3 x 2 1/2     | —               | —               | —                            | —                            | —                         | —                         | —        | —        |
| 3 x 2         | 2.52            | 2.89            | 4.28                         | 2.96                         | 0.98                      | 0.75                      | 1.32     | 2.13     |
| 4 x 3         | 3.30            | 3.60            | 5.40                         | 4.28                         | 1.08                      | 0.98                      | 2.00     | 2.40     |



\* Manufactured to WARD specifications

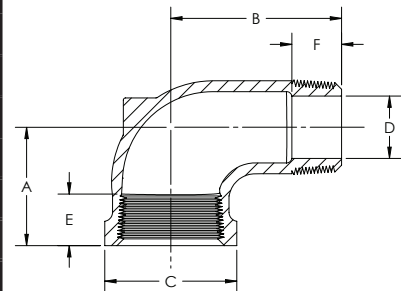
## MALLEABLE IRON 45° ELL CLASS 150

| NPS   | Center to End A | Outside Dia. of Band B | Length of Threads C (min) | Take Out |
|-------|-----------------|------------------------|---------------------------|----------|
| 1/8   | 0.73            | 0.69                   | 0.25                      | 0.46     |
| 1/4   | 0.73            | 0.84                   | 0.32                      | 0.32     |
| 3/8   | 0.80            | 1.01                   | 0.36                      | 0.39     |
| 1/2   | 0.88            | 1.20                   | 0.43                      | 0.34     |
| 3/4   | 0.98            | 1.46                   | 0.50                      | 0.43     |
| 1     | 1.12            | 1.77                   | 0.58                      | 0.43     |
| 1 1/4 | 1.29            | 2.15                   | 0.67                      | 0.58     |
| 1 1/2 | 1.43            | 2.43                   | 0.70                      | 0.70     |
| 2     | 1.68            | 2.96                   | 0.75                      | 0.92     |
| 2 1/2 | 1.95            | 3.59                   | 0.92                      | 0.81     |
| 3     | 2.17            | 4.28                   | 0.98                      | 0.97     |
| 4     | 2.61            | 5.40                   | 1.08                      | 1.31     |
| 5     | —               | —                      | —                         | —        |
| 6     | —               | —                      | —                         | —        |



## MALLEABLE IRON 90° STREET ELL CLASS 150

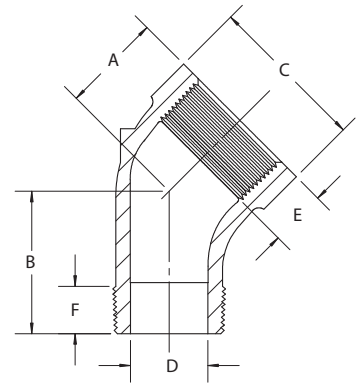
| NPS            | Center to End A | Center to Male B | Outside Dia. of Band C (min) | Port Dia. Male End D (max) | Length of Internal Threads E (min) | Length of External Threads F (min) | Take Out Male End | Take-Out Female End |
|----------------|-----------------|------------------|------------------------------|----------------------------|------------------------------------|------------------------------------|-------------------|---------------------|
| 1/8            | 0.69            | 1.00             | 0.69                         | 0.20                       | 0.25                               | 0.26                               | 0.73              | 0.42                |
| 1/4            | 0.81            | 1.19             | 0.84                         | 0.26                       | 0.32                               | 0.40                               | 0.78              | 0.40                |
| 3/8            | 0.95            | 1.44             | 1.01                         | 0.37                       | 0.36                               | 0.41                               | 1.03              | 0.54                |
| 1/2            | 1.12            | 1.63             | 1.20                         | 0.51                       | 0.43                               | 0.53                               | 1.09              | 0.58                |
| 1/2 x 3/8      | —               | —                | —                            | —                          | —                                  | —                                  | —                 | —                   |
| 3/4            | 1.31            | 1.89             | 1.46                         | 0.69                       | 0.50                               | 0.55                               | 1.34              | 0.76                |
| *3/4 x 1/2     | 1.31            | 1.76             | 1.46                         | 0.51                       | 0.50                               | 0.53                               | 1.21              | 0.77                |
| 1              | 1.50            | 2.14             | 1.77                         | 0.91                       | 0.58                               | 0.68                               | 1.45              | 0.81                |
| 1 x 3/4        | —               | —                | —                            | —                          | —                                  | —                                  | —                 | —                   |
| 1 1/4          | 1.75            | 2.45             | 2.15                         | 1.19                       | 0.67                               | 0.71                               | 1.74              | 1.04                |
| *1 1/4 x 1     | 1.75            | 2.29             | 2.15                         | 0.91                       | 0.67                               | 0.68                               | 1.58              | 1.06                |
| 1 1/4 x 3/4    | —               | —                | —                            | —                          | —                                  | —                                  | —                 | 0.54                |
| 1 1/2          | 1.94            | 2.69             | 2.43                         | 1.39                       | 0.70                               | 0.72                               | 1.96              | 1.21                |
| *1 1/2 x 1 1/4 | 1.81            | 2.62             | 2.43                         | 1.19                       | 0.70                               | 0.72                               | 1.90              | 1.10                |
| *1 1/2 x 1     | 1.94            | 2.54             | 2.43                         | 0.91                       | 0.70                               | 0.68                               | 1.81              | 1.25                |
| 2              | 2.25            | 3.26             | 2.96                         | 1.79                       | 0.75                               | 0.76                               | 2.50              | 1.49                |
| 2 x 1 1/2      | —               | —                | —                            | —                          | —                                  | —                                  | —                 | —                   |
| 2 1/2          | 2.70            | 3.86             | 3.59                         | 2.20                       | 0.92                               | 1.14                               | 2.72              | 1.56                |
| 3              | 3.08            | 4.51             | 4.28                         | 2.78                       | 0.98                               | 1.20                               | 3.31              | 1.88                |
| 4              | —               | —                | —                            | —                          | —                                  | —                                  | —                 | —                   |



\* Manufactured to WARD specifications

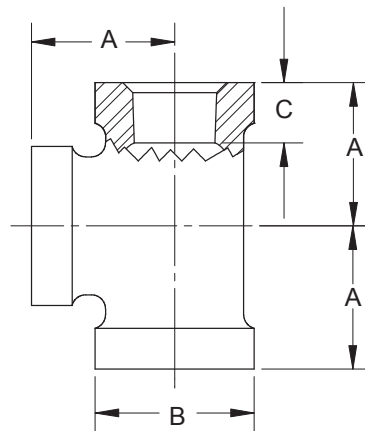
## MALLEABLE IRON STREET 45° ELL CLASS 150

| NPS   | Center to End A | Center to Male B | Outside Dia. of Band C (min) | Port Dia. Male End D (max) | Length of Internal Threads E (min) | Length of External Threads F (min) | Take Out Male End | Take Out Female End |
|-------|-----------------|------------------|------------------------------|----------------------------|------------------------------------|------------------------------------|-------------------|---------------------|
| 1/8   | 0.69            | 0.94             | 0.69                         | 0.20                       | 0.25                               | 0.26                               | 0.67              | 0.42                |
| 1/4   | 0.73            | 0.94             | 0.84                         | 0.26                       | 0.32                               | 0.40                               | 0.53              | 0.32                |
| 3/8   | 0.80            | 1.03             | 1.01                         | 0.37                       | 0.36                               | 0.41                               | 0.62              | 0.39                |
| 1/2   | 0.88            | 1.15             | 1.20                         | 0.51                       | 0.43                               | 0.53                               | 0.61              | 0.34                |
| 3/4   | 0.98            | 1.29             | 1.46                         | 0.69                       | 0.50                               | 0.55                               | 0.74              | 0.43                |
| 1     | 1.12            | 1.47             | 1.77                         | 0.91                       | 0.58                               | 0.68                               | 0.78              | 0.43                |
| 1 1/4 | 1.29            | 1.71             | 2.15                         | 1.19                       | 0.67                               | 0.71                               | 1.00              | 0.58                |
| 1 1/2 | 1.43            | 1.88             | 2.43                         | 1.39                       | 0.70                               | 0.72                               | 1.15              | 0.70                |
| 2     | 1.68            | 2.22             | 2.96                         | 1.79                       | 0.75                               | 0.76                               | 1.46              | 0.92                |



## MALLEABLE IRON STRAIGHT TEES CLASS 150

| NPS   | Center to End A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|-----------------|------------------------------|---------------------------|----------|
| 1/8   | 0.69            | 0.69                         | 0.25                      | 0.42     |
| 1/4   | 0.81            | 0.84                         | 0.32                      | 0.40     |
| 3/8   | 0.95            | 1.01                         | 0.36                      | 0.54     |
| 1/2   | 1.12            | 1.20                         | 0.43                      | 0.58     |
| 3/4   | 1.31            | 1.46                         | 0.50                      | 0.76     |
| 1     | 1.50            | 1.77                         | 0.58                      | 0.81     |
| 1 1/4 | 1.75            | 2.15                         | 0.67                      | 1.04     |
| 1 1/2 | 1.94            | 2.43                         | 0.70                      | 1.21     |
| 2     | 2.25            | 2.96                         | 0.75                      | 1.49     |
| 2 1/2 | 2.70            | 3.59                         | 0.92                      | 1.56     |
| 3     | 3.08            | 4.28                         | 0.98                      | 1.88     |
| 3 1/2 | —               | —                            | —                         | —        |
| 4     | 3.79            | 5.40                         | 1.08                      | 2.49     |
| 6     | —               | —                            | —                         | —        |





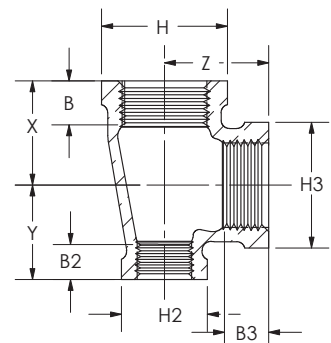
# MALLEABLE IRON REDUCING TEES CLASS 150

| NPS                   | Center to End X | Center to End Y | Center to End Z | Outside Dia. H (min) | Outside Dia. H2 (min) | Outside Dia. H3 (min) | Thread Length B (min) | Thread Length B2 (min) | Thread Length B3 (min) | Take Out | Take Out | Take Out |
|-----------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|-----------------------|-----------------------|------------------------|------------------------|----------|----------|----------|
| 1/4 x 1/4 x 1/8       | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 1/8 x 1/8 x 1/4       | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 3/8 x 3/8 x 1/4       | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 3/8 x 1/4 x 3/8       | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 3/8 x 1/4 x 1/4       | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 1/4 x 1/4 x 3/8       | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 1/2 x 1/2 x 3/8       | 1.04            | 1.04            | 1.03            | 0.43                 | 0.43                  | 0.36                  | 1.20                  | 1.20                   | 1.01                   | 0.50     | 0.50     | 0.62     |
| 1/2 x 1/2 x 1/4       | 0.97            | 0.97            | 0.98            | 0.43                 | 0.43                  | 0.32                  | 1.20                  | 1.20                   | 0.84                   | 0.43     | 0.43     | 0.57     |
| 1/2 x 3/8 x 1/2       | 1.12            | 1.03            | 1.12            | 0.43                 | 0.36                  | 0.43                  | 1.20                  | 1.01                   | 1.20                   | 0.58     | 0.62     | 0.58     |
| 1/2 x 3/8 x 3/8       | 1.04            | 0.950           | 1.03            | 0.43                 | 0.36                  | 0.36                  | 1.20                  | 1.01                   | 1.01                   | 0.50     | 0.54     | 0.62     |
| 1/2 x 1/4 x 1/2       | 1.12            | 0.98            | 1.12            | 0.43                 | 0.32                  | 0.43                  | 1.20                  | 0.84                   | 1.20                   | 0.58     | 0.60     | 0.58     |
| 3/8 x 3/8 x 1/2       | 1.03            | 1.03            | 1.04            | 0.36                 | 0.36                  | 0.43                  | 1.01                  | 1.01                   | 1.20                   | 0.62     | 0.62     | 0.50     |
| 3/4 x 3/4 x 1/2       | 1.20            | 1.20            | 1.22            | 0.50                 | 0.50                  | 0.43                  | 1.46                  | 1.46                   | 1.20                   | 0.65     | 0.65     | 0.68     |
| 3/4 x 3/4 x 3/8       | 1.12            | 1.12            | 1.13            | 0.50                 | 0.50                  | 0.36                  | 1.46                  | 1.46                   | 1.01                   | 0.57     | 0.57     | 0.72     |
| 3/4 x 3/4 x 1/4       | 1.05            | 1.05            | 1.08            | 0.50                 | 0.50                  | 0.32                  | 1.46                  | 1.46                   | 0.84                   | 0.50     | 0.50     | 0.67     |
| 3/4 x 1/2 x 3/4       | 1.31            | 1.22            | 1.31            | 0.50                 | 0.43                  | 0.50                  | 1.46                  | 1.20                   | 1.46                   | 0.76     | 0.68     | 0.76     |
| 3/4 x 1/2 x 1/2       | 1.20            | 1.12            | 1.22            | 0.50                 | 0.43                  | 0.43                  | 1.46                  | 1.20                   | 1.20                   | 0.65     | 0.58     | 0.68     |
| 3/4 x 3/8 x 3/4       | 1.31            | 1.13            | 1.13            | 0.50                 | 0.36                  | 0.50                  | 1.46                  | 1.01                   | 1.46                   | 0.76     | 0.72     | 0.58     |
| 3/4 x 3/8 x 3/8       | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 3/4 x 1/4 x 3/4       | 1.31            | 1.08            | 1.31            | 0.50                 | 0.32                  | 0.50                  | 1.46                  | 0.84                   | 1.46                   | 0.76     | 0.67     | 0.76     |
| 1/2 x 1/2 x 3/4       | 1.22            | 1.22            | 1.20            | 0.43                 | 0.43                  | 0.50                  | 1.20                  | 1.20                   | 1.46                   | 0.68     | 0.68     | 0.65     |
| 1 x 1 x 3/4           | 1.37            | 1.37            | 1.45            | 0.58                 | 0.58                  | 0.50                  | 1.77                  | 1.77                   | 1.46                   | 0.68     | 0.68     | 0.90     |
| 1 x 1 x 1/2           | 1.26            | 1.26            | 1.36            | 0.58                 | 0.58                  | 0.43                  | 1.77                  | 1.77                   | 1.20                   | 0.57     | 0.57     | 0.82     |
| 1 x 1 x 3/8           | 1.18            | 1.18            | 1.27            | 0.58                 | 0.58                  | 0.36                  | 1.77                  | 1.77                   | 1.01                   | 0.49     | 0.49     | 0.86     |
| 1 X 1 X 1/4           | 1.11            | 1.11            | 1.22            | 0.58                 | 0.58                  | 0.32                  | 1.77                  | 1.77                   | 0.84                   | 0.42     | 0.42     | 0.81     |
| 1 x 3/4 x 1           | 1.50            | 1.45            | 1.50            | 0.58                 | 0.50                  | 0.58                  | 1.77                  | 1.46                   | 1.77                   | 0.81     | 0.90     | 0.81     |
| 1 x 3/4 x 3/4         | 1.37            | 1.31            | 1.45            | 0.58                 | 0.50                  | 0.50                  | 1.77                  | 1.46                   | 1.46                   | 0.68     | 0.76     | 0.90     |
| 1 x 3/4 x 1/2         | 1.26            | 1.20            | 1.36            | 0.58                 | 0.50                  | 0.43                  | 1.77                  | 1.46                   | 1.20                   | 0.57     | 0.65     | 0.82     |
| 1 x 1/2 x 1           | 1.50            | 1.36            | 1.50            | 0.58                 | 0.43                  | 0.58                  | 1.77                  | 1.20                   | 1.77                   | 0.81     | 0.82     | 0.81     |
| 1 x 1/2 x 3/4         | 1.37            | 1.22            | 1.45            | 0.58                 | 0.43                  | 0.50                  | 1.77                  | 1.20                   | 1.46                   | 0.68     | 0.68     | 0.90     |
| 1 x 1/2 x 1/2         | 1.26            | 1.12            | 1.36            | 0.58                 | 0.43                  | 0.43                  | 1.77                  | 1.20                   | 1.20                   | 0.57     | 0.58     | 0.82     |
| 1 x 3/8 x 1           | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| *1 x 1/4 x 1          | 1.50            | 1.20            | 1.50            | 0.58                 | 0.32                  | 0.58                  | 1.77                  | 0.84                   | 1.77                   | 0.81     | 0.79     | 0.81     |
| 1 x 1/8 x 1           | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 3/4 x 3/4 x 1         | 1.45            | 1.45            | 1.37            | 0.50                 | 0.50                  | 0.58                  | 1.46                  | 1.46                   | 1.77                   | 0.90     | 0.90     | 0.68     |
| 1/2 x 1/2 x 1         | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 1 1/4 x 1 1/4 x 1     | 1.58            | 1.58            | 1.67            | 0.67                 | 0.67                  | 0.58                  | 2.15                  | 2.15                   | 1.77                   | 0.87     | 0.87     | 0.98     |
| 1 1/4 x 1 1/4 x 3/4   | 1.45            | 1.45            | 1.62            | 0.67                 | 0.67                  | 0.50                  | 2.15                  | 2.15                   | 1.46                   | 0.74     | 0.74     | 1.07     |
| 1 1/4 x 1 1/4 x 1/2   | 1.34            | 1.34            | 1.53            | 0.67                 | 0.67                  | 0.43                  | 2.15                  | 2.15                   | 1.20                   | 0.63     | 0.63     | 0.99     |
| 1 1/4 x 1 1/4 x 3/8   | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 1 1/4 x 1 x 1 1/4     | 1.75            | 1.67            | 1.75            | 0.67                 | 0.58                  | 0.67                  | 2.15                  | 1.77                   | 2.15                   | 1.04     | 0.98     | 1.04     |
| 1 1/4 x 1 x 1         | 1.58            | 1.50            | 1.67            | 0.67                 | 0.58                  | 0.58                  | 2.15                  | 1.77                   | 1.77                   | 0.87     | 0.81     | 0.98     |
| 1 1/4 x 1 x 3/4       | 1.45            | 1.37            | 1.62            | 0.67                 | 0.58                  | 0.50                  | 2.15                  | 1.77                   | 1.46                   | 0.74     | 0.68     | 1.07     |
| 1 1/4 x 1 x 1/2       | 1.34            | 1.26            | 1.53            | 0.67                 | 0.58                  | 0.43                  | 2.15                  | 1.77                   | 1.20                   | 0.63     | 0.57     | 0.99     |
| 1 1/4 x 3/4 x 1 1/4   | 1.75            | 1.62            | 1.75            | 0.67                 | 0.50                  | 0.67                  | 2.15                  | 1.46                   | 2.15                   | 1.04     | 1.07     | 1.04     |
| 1 1/4 x 3/4 x 1       | 1.58            | 1.45            | 1.67            | 0.67                 | 0.50                  | 0.58                  | 2.15                  | 1.46                   | 1.77                   | 0.87     | 0.90     | 0.98     |
| 1 1/4 x 3/4 x 3/4     | 1.45            | 1.31            | 1.62            | 0.67                 | 0.50                  | 0.50                  | 2.15                  | 1.46                   | 1.46                   | 0.74     | 0.76     | 1.07     |
| 1 1/4 x 1/2 x 1 1/4   | 1.75            | 1.53            | 1.75            | 0.67                 | 0.43                  | 0.67                  | 2.15                  | 1.20                   | 2.15                   | 1.04     | 0.99     | 1.04     |
| 1 1/4 x 1/2 x 1       | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 1 x 1 x 1 1/4         | 1.67            | 1.67            | 1.58            | 0.58                 | 0.58                  | 0.67                  | 1.77                  | 1.77                   | 2.15                   | 0.98     | 0.96     | 0.87     |
| 3/4 x 3/4 x 1 1/4     | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 1 1/2 x 1 1/2 x 1 1/4 | 1.82            | 1.82            | 1.88            | 0.70                 | 0.70                  | 0.67                  | 2.43                  | 2.43                   | 2.15                   | 1.09     | 1.09     | 1.17     |
| 1 1/2 x 1 1/2 x 1     | 1.65            | 1.65            | 1.80            | 0.70                 | 0.70                  | 0.58                  | 2.43                  | 2.43                   | 1.77                   | 0.92     | 0.92     | 1.11     |
| 1 1/2 x 1 1/2 x 3/4   | 1.52            | 1.52            | 1.75            | 0.70                 | 0.70                  | 0.50                  | 2.43                  | 2.43                   | 1.46                   | 0.79     | 0.79     | 1.20     |
| 1 1/2 x 1 1/2 x 1/2   | 1.41            | 1.41            | 1.66            | 0.70                 | 0.70                  | 0.43                  | 2.43                  | 2.43                   | 1.20                   | 0.68     | 0.68     | 1.12     |
| 1 1/2 x 1 1/4 x 1 1/2 | 1.94            | 1.88            | 1.94            | 0.70                 | 0.67                  | 0.70                  | 2.43                  | 2.15                   | 2.43                   | 1.21     | 1.17     | 1.21     |
| 1 1/2 x 1 1/4 x 1 1/4 | 1.82            | 1.75            | 1.88            | 0.70                 | 0.67                  | 0.67                  | 2.43                  | 2.15                   | 2.15                   | 1.09     | 1.04     | 1.17     |
| 1 1/2 x 1 1/4 x 1     | 1.65            | 1.58            | 1.80            | 0.70                 | 0.67                  | 0.58                  | 2.43                  | 2.15                   | 1.77                   | 0.92     | 0.87     | 1.11     |
| 1 1/2 x 1 1/4 x 3/4   | 1.52            | 1.45            | 1.75            | 0.70                 | 0.67                  | 0.50                  | 2.43                  | 2.15                   | 1.46                   | 0.79     | 0.74     | 1.20     |
| 1 1/2 x 1 1/4 x 1/2   | 1.41            | 1.34            | 1.66            | 0.70                 | 0.67                  | 0.43                  | 2.43                  | 2.15                   | 1.20                   | 0.68     | 0.63     | 1.12     |

\* Manufactured to WARD specifications

| NPS                   | Center to End X | Center to End Y | Center to End Z | Outside Dia. H (min) | Outside Dia. H2 (min) | Outside Dia. H3 (min) | Thread Length B (min) | Thread Length B2 (min) | Thread Length B3 (min) | Take Out | Take Out | Take Out |
|-----------------------|-----------------|-----------------|-----------------|----------------------|-----------------------|-----------------------|-----------------------|------------------------|------------------------|----------|----------|----------|
| 1 1/2 x 1 x 1 1/2     | 1.94            | 1.80            | 1.94            | 0.70                 | 0.58                  | 0.70                  | 2.43                  | 1.77                   | 2.43                   | 1.21     | 1.11     | 1.21     |
| 1 1/2 x 1 x 1 1/4     | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 1 1/2 x 1 x 1         | 1.65            | 1.50            | 1.80            | 0.70                 | 0.58                  | 0.58                  | 2.43                  | 1.77                   | 1.77                   | 0.92     | 0.81     | 1.11     |
| 1 1/2 x 3/4 x 1 1/2   | 1.94            | 1.75            | 1.94            | 0.70                 | 0.50                  | 0.70                  | 2.43                  | 1.46                   | 2.43                   | 1.21     | 1.20     | 1.21     |
| *1 1/2 x 3/4 x 3/4    | 1.55            | 1.35            | 1.77            | 0.70                 | 0.50                  | 0.50                  | 2.43                  | 1.46                   | 1.46                   | 0.82     | 0.80     | 1.22     |
| 1 1/2 x 1/2 x 1 1/2   | 1.94            | 1.66            | 1.94            | 0.70                 | 0.43                  | 0.70                  | 2.43                  | 1.20                   | 2.43                   | 1.21     | 1.12     | 1.21     |
| 1 1/4 x 1 1/4 x 1 1/2 | 1.88            | 1.88            | 1.82            | 0.67                 | 0.67                  | 0.70                  | 2.15                  | 2.15                   | 2.43                   | 1.17     | 1.17     | 1.09     |
| 1 x 1 x 1 1/2         | 1.80            | 1.80            | 1.65            | 0.58                 | 0.58                  | 0.70                  | 1.77                  | 1.77                   | 2.43                   | 1.11     | 1.11     | 0.92     |
| 2 x 2 x 1 1/2         | 2.02            | 2.02            | 2.16            | 0.75                 | 0.75                  | 0.70                  | 2.96                  | 2.96                   | 2.43                   | 1.26     | 1.26     | 1.43     |
| 2 x 2 x 1 1/4         | 1.90            | 1.90            | 2.10            | 0.75                 | 0.75                  | 0.67                  | 2.96                  | 2.96                   | 2.15                   | 1.14     | 1.14     | 1.39     |
| 2 x 2 x 1             | 1.73            | 1.73            | 2.02            | 0.75                 | 0.75                  | 0.58                  | 2.96                  | 2.96                   | 1.77                   | 0.97     | 0.97     | 1.33     |
| 2 x 2 x 3/4           | 1.60            | 1.60            | 1.97            | 0.75                 | 0.75                  | 0.50                  | 2.96                  | 2.96                   | 1.46                   | 0.84     | 0.84     | 1.42     |
| 2 x 2 x 1/2           | 1.49            | 1.49            | 1.88            | 0.75                 | 0.75                  | 0.43                  | 2.96                  | 2.96                   | 1.20                   | 0.73     | 0.73     | 1.34     |
| 2 x 1 1/2 x 2         | 2.25            | 2.16            | 2.25            | 0.75                 | 0.70                  | 0.75                  | 2.96                  | 2.43                   | 2.96                   | 1.49     | 1.43     | 1.49     |
| 2 x 1 1/2 x 1 1/2     | 2.02            | 1.94            | 2.16            | 0.75                 | 0.70                  | 0.70                  | 2.96                  | 2.43                   | 2.43                   | 1.26     | 1.21     | 1.43     |
| 2 x 1 1/2 x 1 1/4     | 1.90            | 1.82            | 2.10            | 0.75                 | 0.70                  | 0.67                  | 2.96                  | 2.43                   | 2.15                   | 1.14     | 1.09     | 1.39     |
| 2 x 1 1/2 x 1         | 1.73            | 1.65            | 2.02            | 0.75                 | 0.70                  | 0.58                  | 2.96                  | 2.43                   | 1.77                   | 0.97     | 0.92     | 1.33     |
| 2 x 1 1/4 x 2         | 2.25            | 2.10            | 2.25            | 0.75                 | 0.67                  | 0.75                  | 2.96                  | 2.15                   | 2.96                   | 1.49     | 1.39     | 1.49     |
| 2 X 1 1/4 X 1 1/2     | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 2 x 1 1/4 x 1 1/4     | 1.90            | 1.75            | 2.10            | 0.75                 | 0.67                  | 0.67                  | 2.96                  | 2.15                   | 2.15                   | 1.14     | 1.04     | 1.39     |
| 2 x 1 x 2             | 2.25            | 2.02            | 2.25            | 0.75                 | 0.58                  | 0.75                  | 2.96                  | 1.77                   | 2.96                   | 1.49     | 1.33     | 1.49     |
| *2 x 1 x 1            | 1.78            | 1.68            | 2.08            | 0.75                 | 0.58                  | 0.58                  | 2.96                  | 1.77                   | 1.77                   | 1.02     | 0.99     | 1.39     |
| 2 x 3/4 x 2           | 2.25            | 1.97            | 2.25            | 0.75                 | 0.50                  | 0.75                  | 2.96                  | 1.46                   | 2.96                   | 1.49     | 1.42     | 1.49     |
| 2 x 1/2 x 2           | 2.25            | 1.88            | 2.25            | 0.75                 | 0.43                  | 0.75                  | 2.96                  | 1.20                   | 2.96                   | 1.49     | 1.34     | 1.49     |
| 1 1/2 x 1 1/2 x 2     | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 1 1/4 x 1 1/4 x 2     | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 1 x 1 x 2             | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 2 1/2 x 2 1/2 x 2     | 2.39            | 2.39            | 2.60            | 0.92                 | 0.92                  | 0.75                  | 3.59                  | 3.59                   | 2.96                   | 1.25     | 1.25     | 1.84     |
| 2 1/2 x 2 1/2 x 1 1/2 | 2.16            | 2.16            | 2.51            | 0.92                 | 0.92                  | 0.70                  | 3.59                  | 3.59                   | 2.43                   | 1.02     | 1.02     | 1.78     |
| 2 1/2 x 2 1/2 x 1 1/4 | 2.04            | 2.04            | 2.45            | 0.92                 | 0.92                  | 0.67                  | 3.59                  | 3.59                   | 2.15                   | 0.90     | 0.90     | 1.74     |
| 2 1/2 x 2 1/2 x 1     | 1.87            | 1.87            | 2.37            | 0.92                 | 0.92                  | 0.58                  | 3.59                  | 3.59                   | 1.77                   | 0.73     | 0.73     | 1.68     |
| 2 1/2 x 2 1/2 x 3/4   | 1.74            | 1.74            | 2.32            | 0.92                 | 0.92                  | 0.50                  | 3.59                  | 3.59                   | 1.46                   | 0.60     | 0.60     | 1.77     |
| 2 1/2 x 2 x 2 1/2     | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 2 1/2 x 2 x 2         | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 2 1/2 x 1 1/2 x 2 1/2 | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 2 1/2 x 1 1/2 x 2     | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 2 x 2 x 2 1/2         | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 3 x 3 x 2 1/2         | 2.83            | 2.83            | 2.99            | 0.98                 | 0.98                  | 0.92                  | 4.28                  | 4.28                   | 3.59                   | 1.63     | 1.63     | 1.85     |
| 3 x 3 x 2             | 2.52            | 2.52            | 2.89            | 0.98                 | 0.98                  | 0.75                  | 4.28                  | 4.28                   | 2.96                   | 1.32     | 1.32     | 2.13     |
| 3 x 3 x 1 1/2         | 2.29            | 2.29            | 2.80            | 0.98                 | 0.98                  | 0.70                  | 4.28                  | 4.28                   | 2.43                   | 1.09     | 1.09     | 2.07     |
| 3 x 3 x 1 1/4         | 2.17            | 2.17            | 2.74            | 0.98                 | 0.98                  | 0.67                  | 4.28                  | 4.28                   | 2.15                   | 0.97     | 0.97     | 2.03     |
| 3 x 3 x 1             | 2.00            | 2.00            | 2.66            | 0.98                 | 0.98                  | 0.58                  | 4.28                  | 4.28                   | 1.77                   | 0.80     | 0.80     | 1.97     |
| 3 x 3 x 3/4           | 1.87            | 1.87            | 2.61            | 0.98                 | 0.98                  | 0.50                  | 4.28                  | 4.28                   | 1.46                   | 0.67     | 0.67     | 2.06     |
| 3 x 2 1/2 x 2 1/2     | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 3 x 2 1/2 x 2         | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 3 x 2 x 3             | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 3 x 2 x 2             | 2.52            | 2.25            | 2.89            | 0.98                 | 0.75                  | 0.75                  | 4.28                  | 2.96                   | 2.96                   | 1.32     | 1.49     | 2.13     |
| 2 1/2 x 2 1/2 x 3     | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 4 x 4 x 3             | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 4 x 4 x 2 1/2         | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 4 x 4 x 2             | 2.74            | 2.74            | 3.41            | 1.08                 | 1.08                  | 0.75                  | 5.40                  | 5.40                   | 2.96                   | 1.44     | 1.44     | 2.65     |
| 4 x 4 x 1 1/2         | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |
| 4 x 3 x 4             | —               | —               | —               | —                    | —                     | —                     | —                     | —                      | —                      | —        | —        | —        |

\* Manufactured to WARD specifications

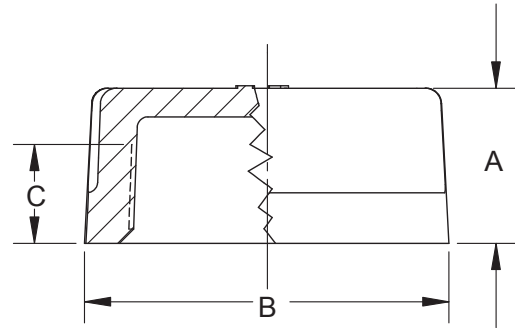


## MALLEABLE IRON PIPE CAPS CLASS 150

| NPS   | Overall Height A (min) | Outside Dia. of Band B (min) | Length of Threads C (min) |
|-------|------------------------|------------------------------|---------------------------|
| *1/8  | 0.53                   | 0.56                         | 0.25                      |
| +1/4  | 0.63                   | 0.84                         | 0.32                      |
| +3/8  | 0.74                   | 1.01                         | 0.36                      |
| +1/2  | 0.87                   | 1.20                         | 0.43                      |
| +3/4  | 0.97                   | 1.46                         | 0.50                      |
| 1     | 1.16                   | 1.770                        | 0.58                      |
| 1 1/4 | 1.28                   | 2.15                         | 0.67                      |
| 1 1/2 | 1.33                   | 2.43                         | 0.70                      |
| 2     | 1.45                   | 3.00                         | 0.75                      |
| 2 1/2 | 1.70                   | 3.59                         | 0.92                      |
| 3     | 1.80                   | 4.28                         | 0.98                      |
| 3 1/2 | —                      | —                            | —                         |
| 4     | 2.08                   | 5.40                         | 1.08                      |
| 5     | —                      | —                            | —                         |
| 6     | —                      | —                            | —                         |
| 8     | —                      | —                            | —                         |

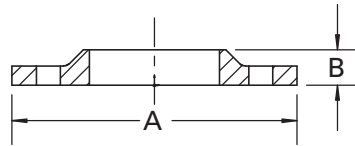
+ Made in Malleable Iron and Steel

\* Made in Steel



## MALLEABLE IRON WASTE NUTS CLASS 150

| NPS  | End to End A | Height B |
|------|--------------|----------|
| *1/2 | 2.42         | 0.34     |
| *3/4 | 2.65         | 0.32     |
| *1   | 2.99         | 0.37     |



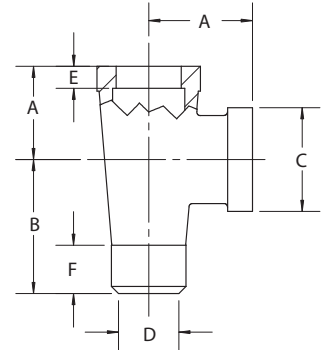
\* Manufactured to WARD specifications



## MALLEABLE IRON STREET TEES CLASS 150

| NPS                | Center to End A | Center to Male B | Outside Dia. of Band C (min) | Port Dia. Male End D (max) | Length of Internal Thread E (min) | Length of External Thread F (min) | Take Out Male End | Take Out Female End |
|--------------------|-----------------|------------------|------------------------------|----------------------------|-----------------------------------|-----------------------------------|-------------------|---------------------|
| 1/4                | —               | —                | —                            | —                          | —                                 | —                                 | —                 | —                   |
| 3/8                | —               | —                | —                            | —                          | —                                 | —                                 | —                 | —                   |
| 1/2                | —               | —                | —                            | —                          | —                                 | —                                 | —                 | —                   |
| 3/4                | 1.31            | 1.89             | 1.46                         | 0.69                       | 0.50                              | 0.55                              | 1.34              | 0.76                |
| 1                  | 1.50            | 2.14             | 1.77                         | 0.91                       | 0.58                              | 0.68                              | 1.45              | 0.81                |
| 1 1/4              | 1.75            | 2.45             | 2.15                         | 1.19                       | 0.67                              | 0.71                              | 1.74              | 1.04                |
| 1 1/2              | 1.94            | 2.69             | 2.43                         | 1.39                       | 0.70                              | 0.72                              | 1.96              | 1.21                |
| 2                  | 2.25            | 3.26             | 2.96                         | 1.79                       | 0.75                              | 0.76                              | 2.50              | 1.49                |
| *1 1/4 x 1 x 1 1/4 | 1.75            | 2.45             | 2.15                         | 0.91                       | 0.67                              | 0.68                              | 1.76              | 1.04                |

\* Manufactured to WARD specifications



## MALLEABLE IRON COUPLING, CLASS 150

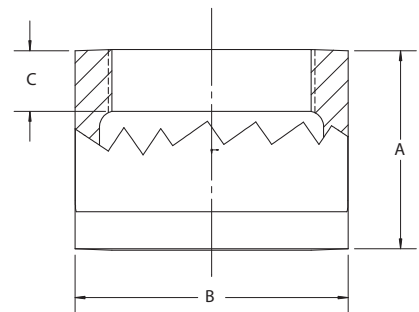
### STRAIGHT COUPLING

| NPS   | Length of Coupling A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|----------------------|------------------------------|---------------------------|----------|
| +1/8  | 0.96                 | 0.69                         | 0.25                      | 0.13     |
| 1/4   | 1.06                 | 0.84                         | 0.32                      | 0.17     |
| 3/8   | 1.16                 | 1.01                         | 0.36                      | 0.14     |
| 1/2   | 1.34                 | 1.20                         | 0.43                      | 0.21     |
| 3/4   | 1.52                 | 1.46                         | 0.50                      | 0.15     |
| 1     | 1.67                 | 1.77                         | 0.58                      | 0.26     |
| 1 1/4 | 1.93                 | 2.15                         | 0.67                      | 0.35     |
| 1 1/2 | 2.15                 | 2.43                         | 0.70                      | 0.51     |
| 2     | 2.53                 | 2.96                         | 0.75                      | 0.30     |
| 2 1/2 | 2.88                 | 3.59                         | 0.92                      | 0.39     |
| 3     | 3.18                 | 4.28                         | 0.98                      | 0.55     |
| 4     | 3.69                 | 5.40                         | 1.08                      | 2.39     |

+ Steel

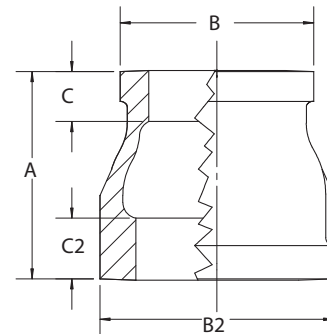
### RIGHT & LEFT THREAD COUPLING

| NPS   | Length of Coupling A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|----------------------|------------------------------|---------------------------|----------|
| 1/2   | 1.34                 | 1.20                         | 0.43                      | 0.14     |
| 3/4   | 1.52                 | 1.46                         | 0.50                      | 0.21     |
| 1     | 1.67                 | 1.77                         | 0.58                      | 0.15     |
| 1 1/4 | 1.93                 | 2.15                         | 0.67                      | 0.26     |
| 1 1/2 | 2.15                 | 2.43                         | 0.70                      | 0.35     |
| 2     | 2.53                 | 2.96                         | 0.75                      | 0.51     |



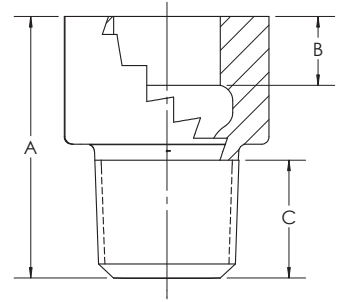
# MALLEABLE IRON REDUCING COUPLING CLASS 150

| NPS           | Length of Coupling A | Outside Dia. Small Band B (min) | Outside Dia. Large Band B2 (min) | Length of Threads Small End C (min) | Length of Threads Large End C2 (min) | Take Out | Take Out |
|---------------|----------------------|---------------------------------|----------------------------------|-------------------------------------|--------------------------------------|----------|----------|
| 1/4 x 1/8     | 1.00                 | 0.69                            | 0.84                             | 0.25                                | 0.32                                 | 0.10     | 0.24     |
| 3/8 x 1/4     | 1.13                 | 0.84                            | 1.01                             | 0.32                                | 0.36                                 | 0.16     | 0.16     |
| 3/8 x 1/8     | 1.13                 | 0.69                            | 1.01                             | 0.25                                | 0.36                                 | 0.16     | 0.30     |
| 1/2 x 3/8     | 1.25                 | 1.01                            | 1.20                             | 0.36                                | 0.43                                 | 0.09     | 0.22     |
| 1/2 x 1/4     | 1.25                 | 0.84                            | 1.20                             | 0.32                                | 0.43                                 | 0.09     | 0.22     |
| 1/2 x 1/8     | 1.25                 | 0.69                            | 1.20                             | 0.25                                | 0.43                                 | 0.09     | 0.36     |
| 3/4 x 1/2     | 1.44                 | 1.20                            | 1.46                             | 0.43                                | 0.50                                 | 0.17     | 0.19     |
| 3/4 x 3/8     | 1.44                 | 1.01                            | 1.46                             | 0.36                                | 0.50                                 | 0.17     | 0.31     |
| 3/4 x 1/4     | 1.44                 | 0.84                            | 1.46                             | 0.32                                | 0.50                                 | 0.17     | 0.32     |
| 3/4 x 1/8     | 1.44                 | 0.69                            | 1.46                             | 0.25                                | 0.50                                 | 0.894    | 0.17     |
| 1 x 3/4       | 1.69                 | 1.46                            | 1.77                             | 0.50                                | 0.58                                 | 0.16     | 0.30     |
| 1 x 1/2       | 1.69                 | 1.20                            | 1.77                             | 0.43                                | 0.58                                 | 0.16     | 0.31     |
| 1 x 3/8       | 1.69                 | 1.01                            | 1.77                             | 0.36                                | 0.58                                 | 0.16     | 0.44     |
| 1 x 1/4       | 1.69                 | 0.84                            | 1.77                             | 0.32                                | 0.58                                 | 0.16     | 0.44     |
| 1 x 1/8       | —                    | —                               | —                                | —                                   | —                                    | —        | —        |
| 1 1/4 x 1     | 2.06                 | 1.77                            | 2.15                             | 0.58                                | 0.67                                 | 0.32     | 0.35     |
| 1 1/4 x 3/4   | 2.06                 | 1.46                            | 2.15                             | 0.50                                | 0.67                                 | 0.32     | 0.48     |
| 1 1/4 x 1/2   | 2.06                 | 1.20                            | 2.15                             | 0.43                                | 0.67                                 | 0.32     | 0.50     |
| 1 1/2 x 1 1/4 | 2.31                 | 2.15                            | 2.43                             | 0.67                                | 0.70                                 | 0.43     | 0.45     |
| 1 1/2 x 1     | 2.31                 | 1.77                            | 2.43                             | 0.58                                | 0.70                                 | 0.43     | 0.47     |
| 1 1/2 x 3/4   | 2.31                 | 1.46                            | 2.43                             | 0.50                                | 0.70                                 | 0.43     | 0.61     |
| 1 1/2 x 1/2   | 2.31                 | 1.20                            | 2.43                             | 0.43                                | 0.70                                 | 0.43     | 0.62     |
| 2 x 1 1/2     | 2.81                 | 2.43                            | 2.96                             | 0.70                                | 0.75                                 | 0.65     | 0.68     |
| 2 x 1 1/4     | 2.81                 | 2.15                            | 2.96                             | 0.67                                | 0.75                                 | 0.65     | 0.70     |
| 2 x 1         | 2.81                 | 1.77                            | 2.96                             | 0.58                                | 0.75                                 | 0.65     | 0.72     |
| 2 x 3/4       | 2.81                 | 1.46                            | 2.96                             | 0.50                                | 0.75                                 | 0.65     | 0.86     |
| 2 x 1/2       | 2.81                 | 1.20                            | 2.96                             | 0.43                                | 0.75                                 | 0.65     | 0.87     |
| 2 1/2 x 2     | 3.25                 | 2.96                            | 3.59                             | 0.75                                | 0.92                                 | 0.49     | 0.87     |
| 2 1/2 x 1 1/2 | 3.25                 | 2.43                            | 3.59                             | 0.70                                | 0.92                                 | 0.49     | 0.90     |
| 2 1/2 x 1 1/4 | 3.25                 | 2.43                            | 3.59                             | 0.67                                | 0.92                                 | 0.49     | 0.92     |
| 2 1/2 x 1     | 3.25                 | 1.77                            | 3.59                             | 0.58                                | 0.92                                 | 0.49     | 0.94     |
| 3 x 2 1/2     | 3.69                 | 3.59                            | 4.28                             | 0.92                                | 0.98                                 | 0.65     | 0.71     |
| 3 x 2         | 3.69                 | 2.96                            | 4.28                             | 0.75                                | 0.98                                 | 0.65     | 1.09     |
| 3 x 1 1/2     | 3.69                 | 2.43                            | 4.28                             | 0.70                                | 0.98                                 | 0.65     | 1.12     |
| 3 x 1 1/4     | 3.69                 | 2.15                            | 4.28                             | 0.67                                | 0.98                                 | 0.65     | 1.14     |
| 3 x 1         | 3.69                 | 1.77                            | 4.28                             | 0.58                                | 0.98                                 | 0.65     | 1.16     |
| 3 1/2 x 3     | —                    | —                               | —                                | —                                   | —                                    | —        | —        |
| 3 1/2 x 2     | —                    | —                               | —                                | —                                   | —                                    | —        | —        |
| 4 x 3 1/2     | —                    | —                               | —                                | —                                   | —                                    | —        | —        |
| 4 x 3         | 4.38                 | 4.28                            | 5.40                             | 0.98                                | 1.08                                 | 0.89     | 0.99     |
| 4 x 2 1/2     | 4.38                 | 3.59                            | 5.40                             | 0.92                                | 1.08                                 | 0.89     | 1.05     |
| 4 x 2         | 4.38                 | 2.96                            | 5.40                             | 0.75                                | 1.08                                 | 0.89     | 1.43     |
| 4 x 1 1/2     | —                    | —                               | —                                | —                                   | —                                    | —        | —        |
| 5 x 4         | —                    | —                               | —                                | —                                   | —                                    | —        | —        |
| 6 x 4         | —                    | —                               | —                                | —                                   | —                                    | —        | —        |



## MALLEABLE IRON EXTENSION PIECES CLASS 150

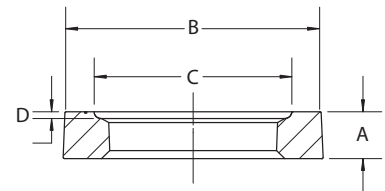
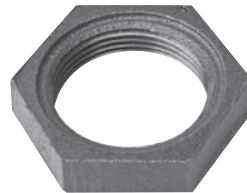
| NPS    | Overall Length A | Length of Internal Threads B (min) | Length of External Threads C (min) | Take Out Female End | Take Out Male End |
|--------|------------------|------------------------------------|------------------------------------|---------------------|-------------------|
| *3/8   | 1.50             | 0.36                               | 0.40                               | 1.09                | 1.09              |
| *1/2   | 1.95             | 0.43                               | 0.53                               | 1.41                | 1.41              |
| *3/4   | 2.06             | 0.50                               | 0.54                               | 1.51                | 1.51              |
| *1     | 2.23             | 0.58                               | 0.68                               | 1.54                | 1.54              |
| *1 1/4 | 2.56             | 0.67                               | 0.63                               | 1.85                | 1.85              |
| *2     | —                | —                                  | —                                  | —                   | —                 |



\* Manufactured to WARD specifications

## MALLEABLE IRON LOCKNUTS CLASS 150

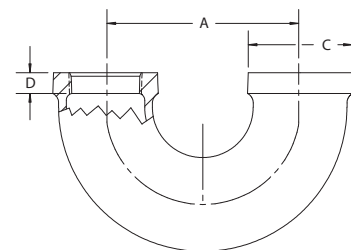
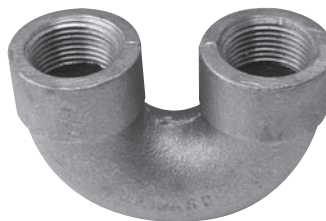
| NPS   | Overall Height A | Length-Across Flat B (min) | Packing Groove Width C | Packing Groove Depth D |
|-------|------------------|----------------------------|------------------------|------------------------|
| +1/8  | 0.19             | 0.69                       | 0.50                   | 0.04                   |
| +1/4  | 0.25             | 0.84                       | 0.66                   | 0.06                   |
| 3/8   | 0.28             | 1.00                       | 0.77                   | 0.06                   |
| 1/2   | 0.31             | 1.18                       | 0.97                   | 0.06                   |
| 3/4   | 0.34             | 1.43                       | 1.23                   | 0.06                   |
| 1     | 0.38             | 1.75                       | 1.50                   | 0.06                   |
| 1 1/4 | 0.42             | 2.10                       | 1.86                   | 0.06                   |
| 1 1/2 | 0.47             | 2.35                       | 2.12                   | 0.06                   |
| 2     | 0.53             | 2.88                       | 2.63                   | 0.09                   |



+STEEL  
Made to ASME B16.14

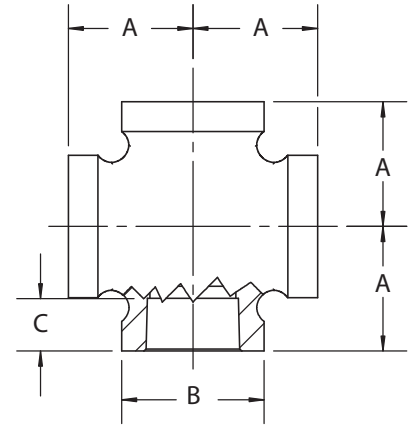
## MALLEABLE IRON RETURN BEND OPEN CLASS 150

| NPS | Center to Center A | Outside Dia. of Band C (min) | Length of Threads D (min) |
|-----|--------------------|------------------------------|---------------------------|
| 1/2 | 1.50               | 1.20                         | 0.43                      |
| 3/4 | 2.00               | 1.46                         | 0.50                      |
| 1   | 3.00               | 1.77                         | 0.58                      |



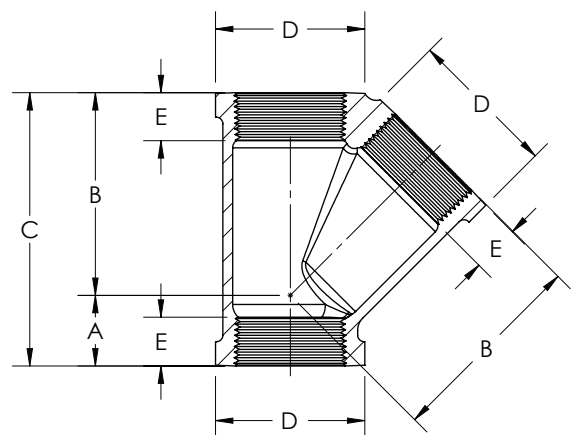
## MALLEABLE IRON CROSS CLASS 150

| NPS   | Center to End A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|-----------------|------------------------------|---------------------------|----------|
| 1/8   | —               | —                            | —                         | —        |
| 1/4   | 0.81            | 0.84                         | 0.32                      | 0.40     |
| 3/8   | 0.95            | 1.01                         | 0.36                      | 0.54     |
| 1/2   | 1.12            | 1.20                         | 0.43                      | 0.58     |
| 3/4   | 1.31            | 1.46                         | 0.50                      | 0.76     |
| 1     | 1.50            | 1.77                         | 0.58                      | 0.81     |
| 1 1/4 | 1.75            | 2.15                         | 0.67                      | 1.04     |
| 1 1/2 | 1.94            | 2.43                         | 0.70                      | 1.21     |
| 2     | 2.25            | 2.96                         | 0.75                      | 1.49     |
| 2 1/2 | —               | —                            | —                         | —        |
| 3     | —               | —                            | —                         | —        |
| 4     | —               | —                            | —                         | —        |



## MALLEABLE IRON 45° Y CLASS 150

| NPS   | Center to End Inlet A | Center to End Outlet B | End to End C | Outside Dia. of Band D (min) | Length of Threads E (min) | Take Out | Take Out |
|-------|-----------------------|------------------------|--------------|------------------------------|---------------------------|----------|----------|
| 3/8   | —                     | —                      | —            | —                            | —                         | —        | —        |
| 1/2   | —                     | —                      | —            | —                            | —                         | —        | —        |
| 3/4   | —                     | —                      | —            | —                            | —                         | —        | —        |
| 1     | —                     | —                      | —            | —                            | —                         | —        | —        |
| 1 1/4 | 1.02                  | 2.92                   | 3.94         | 2.15                         | 0.67                      | 0.67     | 2.21     |
| 1 1/2 | —                     | —                      | —            | —                            | —                         | —        | —        |
| 2     | —                     | —                      | —            | —                            | —                         | —        | —        |
| 2 1/2 | —                     | —                      | —            | —                            | —                         | —        | —        |
| 3     | —                     | —                      | —            | —                            | —                         | —        | —        |
| 4     | —                     | —                      | —            | —                            | —                         | —        | —        |



## SECTION 2

### Extra Heavy Malleable Pipe Fittings Class 300 - (A.A.R.)

**Ward Class 300 Malleable Iron Fittings** are designed to handle higher pressures and more rugged service than our Class 150 fittings. Like all of Ward's fittings, Class 300 fittings are made with the most sophisticated metallurgical and processing controls available. Ward's quality assurance program ensures that the iron is made with high quality raw materials and processed according to rigorous standards. Iron samples are continuously analyzed to ensure that a close grained, high strength, non-porous iron is produced.

Ward starts with high quality iron, then accurately machines threads that comply with the precise standards developed by the American Society of Mechanical Engineers (ASME) and published as an American National Standard. The threads have an accurate form, thread length and straightness to allow them to easily engage thread pipe. In addition, Ward fittings have a chamfered opening to allow faster and easier pipe engagement. This feature also protects the fitting threads from damage during handling.



**Table A**  
**Pressure-Temperature Ratings**  
SIZES

#### General Dimensions In Inches

These dimensions apply to both straight and reducing fittings.

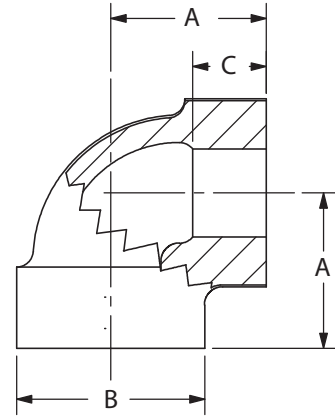
| NPS   | O.D. of Bands | Thread Length (min) |
|-------|---------------|---------------------|
| 1/4   | 0.93          | 0.43                |
| 3/8   | 1.12          | 0.48                |
| 1/2   | 1.34          | 0.56                |
| 3/4   | 1.62          | 0.62                |
| 1     | 1.93          | 0.75                |
| 1 1/4 | 2.37          | 0.84                |
| 1 1/2 | 2.68          | 0.87                |
| 2     | 3.28          | 1.00                |
| 3     | 4.62          | 1.93                |

| Temp. F°   | PSI          |                |                |
|------------|--------------|----------------|----------------|
|            | Size 1/4 - 1 | Size 1 1/4 - 2 | Size 2 1/2 - 3 |
| -20 TO 150 | 2000         | 1500           | 1000           |
| 200        | 1785         | 1350           | 910            |
| 250        | 1575         | 1200           | 825            |
| 300        | 1360         | 1050           | 735            |
| 350        | 1150         | 900            | 650            |
| 400        | 935          | 750            | 560            |
| 450        | 725          | 600            | 475            |
| 500        | 510          | 450            | 385            |
| 550        | 300          | 300            | 300            |

|                                   |                                                           |
|-----------------------------------|-----------------------------------------------------------|
| <b>Material:</b>                  | ASTM A197                                                 |
| <b>Dimensions:</b>                | ASME B16.3<br>ANSI/ASME B1.20.1                           |
| <b>Pressure Ratings:</b>          | ASME B16.3                                                |
| <b>Coatings:</b>                  | ASTM A153<br>ASTM B633                                    |
| <b>Additional Specifications:</b> | UL, ULC, FM NSF 61 and<br>NSF 61 Annex G where applicable |

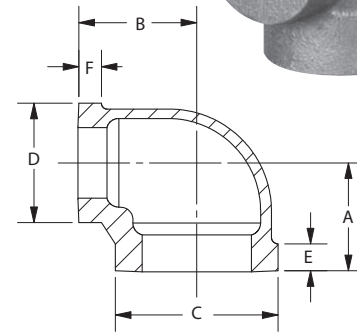
## MALLEABLE IRON 90° STRAIGHT ELL CLASS 300

| NPS   | Center to End A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|-----------------|------------------------------|---------------------------|----------|
| 1/4   | 0.94            | 0.93                         | 0.43                      | 0.53     |
| 3/8   | 1.06            | 1.12                         | 0.47                      | 0.65     |
| 1/2   | 1.25            | 1.34                         | 0.57                      | 0.71     |
| 3/4   | 1.44            | 1.63                         | 0.64                      | 0.89     |
| 1     | 1.63            | 1.95                         | 0.75                      | 0.94     |
| 1 1/4 | 1.94            | 2.39                         | 0.84                      | 1.23     |
| 1 1/2 | 2.13            | 2.68                         | 0.87                      | 1.40     |
| 2     | 2.50            | 3.28                         | 1.00                      | 1.74     |
| 2 1/2 | 2.94            | 3.86                         | 1.17                      | 1.80     |
| 3     | 3.38            | 4.62                         | 1.23                      | 2.18     |
| 4     | —               | —                            | —                         | —        |



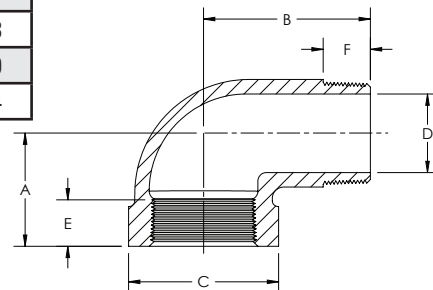
## MALLEABLE IRON REDUCING 90° ELL CLASS 300

| NPS           | Center to End A | Center to End B | Outside Dia. of Band C (min) | Outside Dia. of Band D (min) | Length of Threads E (min) | Length of Threads F (min) | Take Out | Take Out |
|---------------|-----------------|-----------------|------------------------------|------------------------------|---------------------------|---------------------------|----------|----------|
| 3/8 x 1/4     | —               | —               | —                            | —                            | —                         | —                         | —        | —        |
| 1/2 x 3/8     | 1.19            | 1.19            | 1.34                         | 1.12                         | 0.57                      | 0.47                      | 0.65     | 0.78     |
| 3/4 x 1/2     | 1.31            | 1.38            | 1.63                         | 1.34                         | 0.64                      | 0.57                      | 0.76     | 0.84     |
| 1 x 3/4       | 1.50            | 1.56            | 1.95                         | 1.63                         | 0.75                      | 0.64                      | 0.81     | 1.01     |
| 1 x 1/2       | —               | —               | —                            | —                            | —                         | —                         | —        | —        |
| 1 1/4 x 1     | —               | —               | —                            | —                            | —                         | —                         | —        | —        |
| 1 1/4 x 3/4   | —               | —               | —                            | —                            | —                         | —                         | —        | —        |
| 1 1/2 x 1 1/4 | —               | —               | —                            | —                            | —                         | —                         | —        | —        |
| 1 1/2 x 1     | —               | —               | —                            | —                            | —                         | —                         | —        | —        |
| 2 x 1 1/2     | —               | —               | —                            | —                            | —                         | —                         | —        | —        |
| 2 x 1 1/4     | —               | —               | —                            | —                            | —                         | —                         | —        | —        |



## MALLEABLE IRON 90° STREET ELL CLASS 300

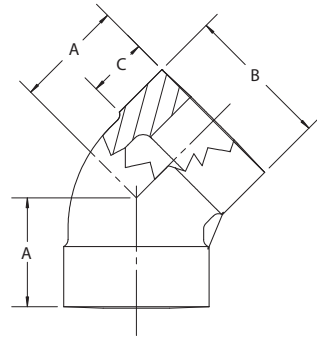
| NPS   | Center to End A | Center to Male End B | Outside Dia. of Band C (min) | Port Dia. Male End D (max) | Length of Internal Threads E (min) | Length of External Threads F (min) | Take Out Male End | Take Out Female End |
|-------|-----------------|----------------------|------------------------------|----------------------------|------------------------------------|------------------------------------|-------------------|---------------------|
| 1/4   | 0.94            | 1.44                 | 0.93                         | 0.26                       | 0.43                               | 0.40                               | 1.03              | 0.53                |
| 3/8   | 1.06            | 1.63                 | 1.12                         | 0.36                       | 0.47                               | 0.41                               | 1.22              | 0.65                |
| 1/2   | 1.25            | 2.00                 | 1.34                         | 0.49                       | 0.57                               | 0.53                               | 1.46              | 0.71                |
| 3/4   | 1.44            | 2.19                 | 1.63                         | 0.67                       | 0.64                               | 0.55                               | 1.64              | 0.89                |
| 1     | 1.63            | 2.25                 | 1.95                         | 0.88                       | 0.75                               | 0.68                               | 1.82              | 0.94                |
| 1 1/4 | 1.94            | 2.88                 | 2.39                         | 1.16                       | 0.84                               | 0.71                               | 2.17              | 1.23                |
| 1 1/2 | 2.13            | 3.13                 | 2.68                         | 1.35                       | 0.87                               | 0.72                               | 2.40              | 1.40                |
| 2     | 2.50            | 3.69                 | 3.28                         | 1.75                       | 1.00                               | 0.76                               | 2.93              | 1.74                |





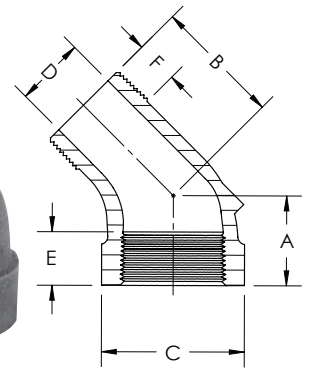
## MALLEABLE IRON 45° ELL CLASS 300

| NPS   | Center to End A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|-----------------|------------------------------|---------------------------|----------|
| 1/4   | 0.81            | 0.93                         | 0.43                      | 0.40     |
| 3/8   | 0.88            | 1.12                         | 0.47                      | 0.47     |
| 1/2   | 1.00            | 1.34                         | 0.57                      | 0.46     |
| 3/4   | 1.13            | 1.63                         | 0.64                      | 0.58     |
| 1     | 1.31            | 1.95                         | 0.75                      | 0.62     |
| 1 1/4 | 1.50            | 2.39                         | 0.84                      | 0.79     |
| 1 1/2 | 1.69            | 2.68                         | 0.87                      | 0.96     |
| 2     | 2.00            | 3.28                         | 1.00                      | 1.24     |
| 2 1/2 | —               | —                            | —                         | —        |
| 3     | —               | —                            | —                         | —        |
| 4     | —               | —                            | —                         | —        |



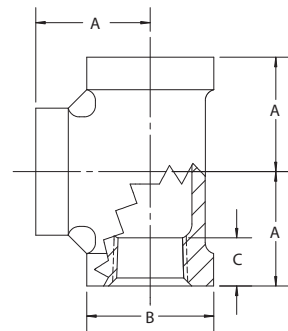
## MALLEABLE IRON 45° STREET ELL CLASS 300

| NPS   | Center to End A | Center to End B | Outside Dia. of Band C (min) | Port Dia. Male D (max) | Internal Length of Threads E (min) | External Length of Threads F (min) | Take Out | Take Out |
|-------|-----------------|-----------------|------------------------------|------------------------|------------------------------------|------------------------------------|----------|----------|
| 1/2   | —               | —               | —                            | —                      | —                                  | —                                  | —        | —        |
| 3/4   | —               | —               | —                            | —                      | —                                  | —                                  | —        | —        |
| 1     | —               | —               | —                            | —                      | —                                  | —                                  | —        | —        |
| 1 1/4 | 1.50            | 2.13            | 2.39                         | 1.16                   | 0.84                               | 0.71                               | 1.42     | 0.79     |
| 1 1/2 | —               | —               | —                            | —                      | —                                  | —                                  | —        | —        |
| 2     | —               | —               | —                            | —                      | —                                  | —                                  | —        | —        |



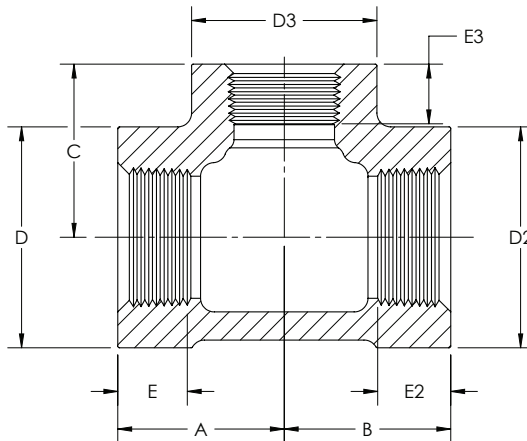
## MALLEABLE IRON STRAIGHT TEE CLASS 300

| NPS   | Center to End A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|-----------------|------------------------------|---------------------------|----------|
| 1/4   | 0.94            | 0.93                         | 0.43                      | 0.53     |
| 3/8   | 1.06            | 1.12                         | 0.47                      | 0.65     |
| 1/2   | 1.25            | 1.34                         | 0.57                      | 0.71     |
| 3/4   | 1.44            | 1.63                         | 0.64                      | 0.89     |
| 1     | 1.63            | 1.95                         | 0.75                      | 0.94     |
| 1 1/4 | 1.94            | 2.39                         | 0.84                      | 1.23     |
| 1 1/2 | 2.13            | 2.68                         | 0.87                      | 1.40     |
| 2     | 2.50            | 3.28                         | 1.00                      | 1.74     |
| 2 1/2 | —               | —                            | —                         | —        |
| 3     | 3.38            | 4.62                         | 1.23                      | 2.18     |
| 4     | —               | —                            | —                         | —        |



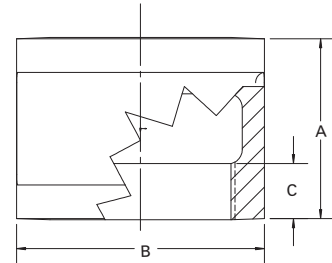
# MALLEABLE IRON REDUCING TEES CLASS 300

| NPS                   | Center to End A | Center to End B | Center to End C | Outside Dia. of Band D (min) | Outside Dia. of Band D2 (min) | Outside Dia. of Band D3 (min) | Length of Threads E (min) | Length of Threads E2 (min) | Length of Threads E3 (min) | Take Out | Take Out | Take Out |
|-----------------------|-----------------|-----------------|-----------------|------------------------------|-------------------------------|-------------------------------|---------------------------|----------------------------|----------------------------|----------|----------|----------|
| 3/4 x 3/4 x 1/2       | 1.31            | 1.31            | 1.38            | 1.63                         | 1.63                          | 1.34                          | 0.64                      | 0.64                       | 0.57                       | 0.76     | 0.76     | 0.84     |
| 3/4 x 3/4 x 3/8       | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 3/4 x 3/4 x 1/4       | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 3/4 x 1/2 x 3/4       | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 3/4 x 1/2 x 1/2       | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 1 x 1 x 3/4           | 1.50            | 1.50            | 1.56            | 1.95                         | 1.95                          | 1.63                          | 0.75                      | 0.75                       | 0.64                       | 0.81     | 0.81     | 1.01     |
| 1 x 1 x 1/2           | 1.44            | 1.44            | 1.50            | 1.95                         | 1.95                          | 1.34                          | 0.75                      | 0.75                       | 0.57                       | 0.75     | 0.75     | 0.96     |
| 1 x 1 x 1/4           | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 1 x 3/4 x 1           | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 1 x 3/4 x 3/4         | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 1 x 1/2 x 1           | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 1 1/4 x 1 1/4 x 1     | 1.75            | 1.75            | 1.81            | 2.39                         | 2.39                          | 1.95                          | 0.84                      | 0.84                       | 0.75                       | 1.04     | 1.04     | 1.12     |
| 1 1/4 x 1 1/4 x 3/4   | 1.63            | 1.63            | 1.75            | 2.39                         | 2.39                          | 1.63                          | 0.84                      | 0.84                       | 0.64                       | 0.92     | 0.92     | 1.20     |
| 1 1/4 x 1 1/4 x 1/2   | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 1 1/4 x 1 x 1         | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 1 1/2 x 1 1/2 x 1 1/4 | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 1 1/2 x 1 1/2 x 1     | 1.81            | 1.81            | 2.00            | 2.68                         | 2.68                          | 1.95                          | 0.87                      | 0.87                       | 0.75                       | 1.08     | 1.08     | 1.31     |
| 1 1/2 x 1 1/2 x 3/4   | 1.69            | 1.69            | 1.88            | 2.68                         | 2.68                          | 1.63                          | 0.87                      | 0.87                       | 0.64                       | 0.96     | 0.96     | 1.33     |
| 1 1/2 x 1 1/2 x 1/2   | 1.63            | 1.63            | 1.81            | 2.68                         | 2.68                          | 1.34                          | 0.87                      | 0.87                       | 0.57                       | 0.90     | 0.90     | 1.27     |
| 2 x 2 x 1 1/2         | 2.25            | 2.25            | 2.38            | 3.28                         | 3.28                          | 2.68                          | 1.00                      | 1.00                       | 0.87                       | 1.49     | 1.49     | 1.65     |
| 2 x 2 x 1 1/4         | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 2 x 2 x 1             | 2.00            | 2.00            | 2.25            | 3.28                         | 3.28                          | 1.95                          | 1.00                      | 1.00                       | 0.75                       | 1.24     | 1.24     | 1.56     |
| 2 x 2 x 3/4           | 1.81            | 1.81            | 2.13            | 3.28                         | 3.28                          | 1.63                          | 1.00                      | 1.00                       | 0.64                       | 1.05     | 1.05     | 1.58     |
| 2 x 2 x 1/2           | 1.75            | 1.75            | 2.06            | 3.28                         | 3.28                          | 1.34                          | 1.00                      | 1.00                       | 0.57                       | 0.99     | 0.99     | 1.52     |
| 2 x 1 1/2 x 2         | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 2 1/2 x 2 1/2 x 2     | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 2 1/2 x 2 1/2 x 1 1/2 | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 3 x 3 x 2             | 2.81            | 2.81            | 3.13            | 4.62                         | 4.62                          | 3.28                          | 1.23                      | 1.23                       | 1.00                       | 1.61     | 1.61     | 2.37     |



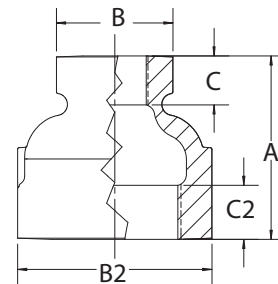
## MALLEABLE IRON STRAIGHT COUPLING CLASS 300

| NPS   | Length of Coupling A (min) | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|----------------------------|------------------------------|---------------------------|----------|
| 1/4   | 1.37                       | 0.93                         | 0.43                      | 0.28     |
| 3/8   | 1.62                       | 1.12                         | 0.47                      | 0.40     |
| 1/2   | 1.87                       | 1.34                         | 0.57                      | 0.40     |
| 3/4   | 2.12                       | 1.63                         | 0.64                      | 0.51     |
| 1     | 2.37                       | 1.95                         | 0.75                      | 0.50     |
| 1 1/4 | 2.87                       | 2.39                         | 0.84                      | 0.73     |
| 1 1/2 | 2.87                       | 2.68                         | 0.87                      | 0.71     |
| 2     | 3.62                       | 3.28                         | 1.00                      | 1.05     |
| 2 1/2 | —                          | —                            | —                         | —        |
| 3     | —                          | —                            | —                         | —        |



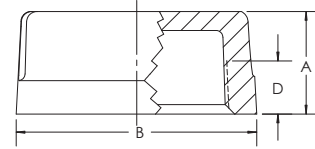
## MALLEABLE IRON REDUCING COUPLING CLASS 300

| NPS           | Length of Coupling A | Outside Dia. of Band Small End B (min) | Outside Dia. of Large End B2 (min) | Length of Threads Small End C (min) | Length of Threads Large End C2 (min) | Take Out | Take Out |
|---------------|----------------------|----------------------------------------|------------------------------------|-------------------------------------|--------------------------------------|----------|----------|
| 3/8 x 1/4     | 1.44                 | 0.93                                   | 1.20                               | 0.43                                | 0.47                                 | 0.31     | 0.32     |
| 1/2 x 3/8     | 1.69                 | 1.12                                   | 1.34                               | 0.47                                | 0.57                                 | 0.31     | 0.44     |
| 1/2 x 1/4     | 1.69                 | 0.93                                   | 1.34                               | 0.43                                | 0.57                                 | 0.31     | 0.44     |
| 3/4 x 1/2     | 1.75                 | 1.34                                   | 1.63                               | 0.57                                | 0.64                                 | 0.33     | 0.34     |
| 3/4 x 3/8     | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 3/4 x 1/4     | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 1 x 3/4       | 2.00                 | 1.63                                   | 1.95                               | 0.64                                | 0.75                                 | 0.32     | 0.45     |
| 1 x 1/2       | 2.00                 | 1.34                                   | 1.95                               | 0.57                                | 0.75                                 | 0.32     | 0.47     |
| 1 x 3/8       | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 1 x 1/4       | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 1 1/4 x 1     | 2.38                 | 1.95                                   | 2.39                               | 0.75                                | 0.84                                 | 0.48     | 0.51     |
| 1 1/4 x 3/4   | 2.38                 | 1.63                                   | 2.39                               | 0.64                                | 0.84                                 | 0.48     | 0.64     |
| 1 1/4 x 1/2   | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 1 1/2 x 1 1/4 | 2.69                 | 2.39                                   | 2.68                               | 0.84                                | 0.87                                 | 0.62     | 0.64     |
| 1 1/2 x 1     | 2.69                 | 1.95                                   | 2.68                               | 0.75                                | 0.87                                 | 0.62     | 0.66     |
| 1 1/2 x 3/4   | 2.69                 | 1.63                                   | 2.68                               | 0.64                                | 0.87                                 | 0.62     | 0.80     |
| 1 1/2 x 1/2   | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 2 x 1 1/2     | 3.19                 | 2.68                                   | 3.28                               | 0.87                                | 1.00                                 | 0.84     | 0.87     |
| 2 x 1 1/4     | 3.19                 | 2.39                                   | 3.28                               | 0.84                                | 1.00                                 | 0.84     | 0.89     |
| 2 x 1         | 3.19                 | 1.95                                   | 3.28                               | 0.75                                | 1.00                                 | 0.84     | 0.91     |
| 2 x 3/4       | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 2 x 1/2       | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 2 1/2 x 2     | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 2 1/2 x 1 1/2 | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 3 x 2 1/2     | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 3 x 2         | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 3 x 1 1/2     | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 4 x 3         | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 4 x 2         | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |



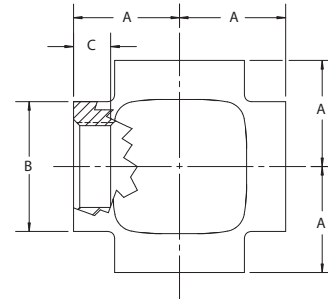
## MALLEABLE IRON PIPE CAPS CLASS 300

| NPS   | Overall Height A | Outside Dia. of Band B (min) | Length of Threads C (min) |
|-------|------------------|------------------------------|---------------------------|
| 1/4   | 0.78             | 0.93                         | 0.43                      |
| 3/8   | 0.83             | 1.12                         | 0.47                      |
| 1/2   | 0.98             | 1.34                         | 0.57                      |
| 3/4   | 1.08             | 1.63                         | 0.64                      |
| 1     | 1.26             | 1.95                         | 0.75                      |
| 1 1/4 | 1.38             | 2.39                         | 0.84                      |
| 1 1/2 | 1.43             | 2.68                         | 0.87                      |
| 2     | 1.68             | 3.28                         | 1.00                      |
| 2 1/2 | —                | —                            | —                         |
| 3     | —                | —                            | —                         |



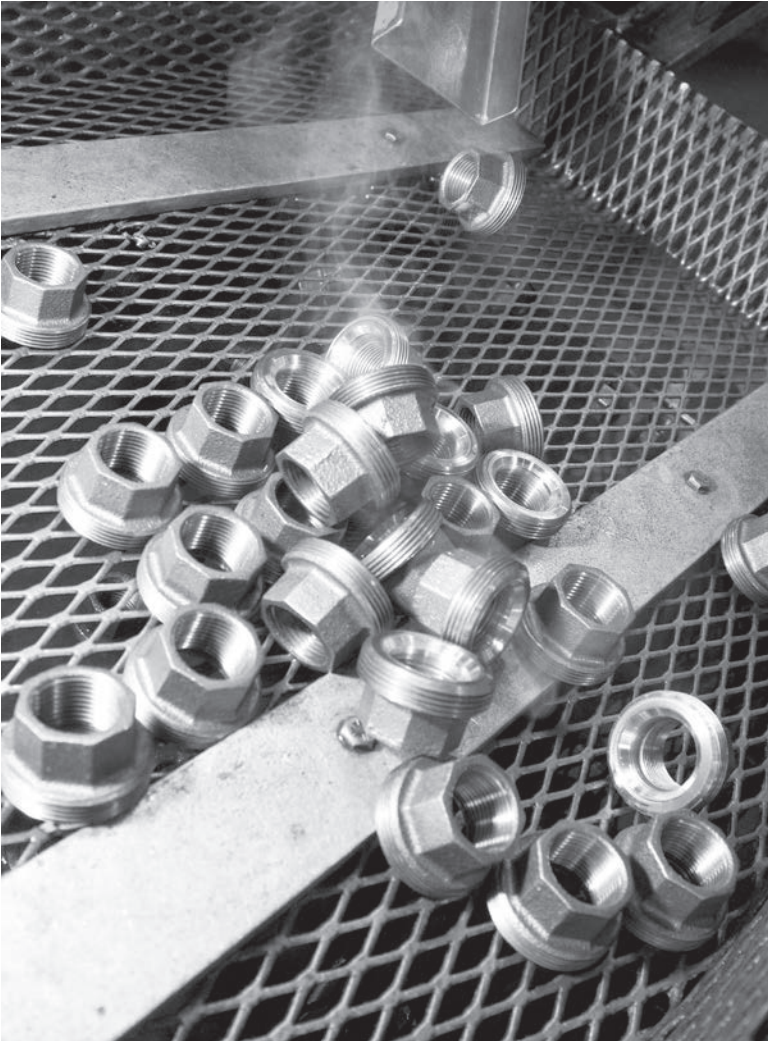
## MALLEABLE IRON CROSS CLASS 300

| NPS   | Center to End A (min) | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|-----------------------|------------------------------|---------------------------|----------|
| 1/4   | —                     | —                            | —                         | —        |
| 1/2   | 1.25                  | 1.34                         | 0.57                      | 0.71     |
| 3/4   | 1.44                  | 1.63                         | 0.64                      | 0.89     |
| 1     | 1.63                  | 1.95                         | 0.75                      | 0.94     |
| 1 1/4 | 1.94                  | 2.39                         | 0.84                      | 1.23     |
| 1 1/2 | 2.13                  | 2.68                         | 0.87                      | 1.40     |
| 2     | 2.50                  | 3.28                         | 1.00                      | 1.74     |



## WARD UNIONS

**Rugged-Strong**  
**Made of the Best Quality Malleable Iron**



Extra heavy brass seat ring accurately machined to insure perfect seating under difficult conditions.

- Suitably Chamfered
- Rust Resistant Treatment
- Properly Threaded

Continuous, careful inspection during each manufacturing operation.

### TYPES AVAILABLE

- Class 150 Brass-to-Iron
- Class 250 Brass-to-Iron
- Class 300 Brass-to-Iron
- Class 150 All Iron Seat
- Class 300 All Iron Seat
- Class 150 Gasket Unions
- Class 300 Brass-to-Brass
- Class 150 Di-Electric Unions  
(Female iron pipe to sweat copper)



Throughout the entire manufacturing process of WARD unions, special emphasis is placed upon the control and accuracy of each operation.

WARD unions are made from closely grained, high tensile iron and are produced under expert laboratory supervision. Modern methods of foundry practice and carefully supervised molding are combined to produce castings that are smooth and clean in every respect and free from imperfection.

WARD unions are manufactured in strict accordance with the requirements for threaded pipe unions standard, developed by American Society of Mechanical Engineers (ASME) and published as an American National Standard. Each opening is chamfered permitting easy assembly. WARD unions make up easily and pull tight for a sealed assembly.

Continuous and careful inspection by trained employees during and after each operation produces quality products which will give satisfaction to the user.



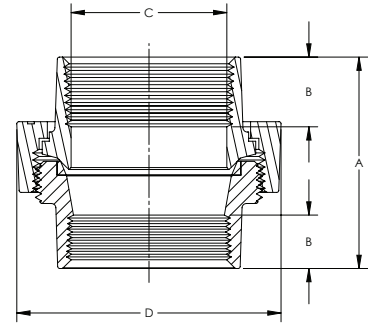
| Temp.F     | PSI       |           |           |
|------------|-----------|-----------|-----------|
|            | Class 150 | Class 250 | Class 300 |
| -20 to 150 | 300       | 500       | 600       |
| 200        | 265       | 455       | 550       |
| 250        | 225       | 405       | 505       |
| 300        | 185       | 460       | 460       |
| 350        | 150       | 315       | 415       |
| 400        | 110       | 270       | 370       |
| 450        | 75        | 225       | 325       |
| 500        | *         | 180       | 280       |
| 550        | *         | 130       | 230       |

- Material:** ASTM A197
- Dimensions:** ASME B16.39  
ANSI/ASME B1.20.1
- Pressure Ratings:** ASME B16.39
- Coatings:** ASTM A153,  
ASTM B633
- Additional Specifications:** UL, ULC and FM where applicable



## WARD UNION BRASS TO IRON SEAT CLASS 150

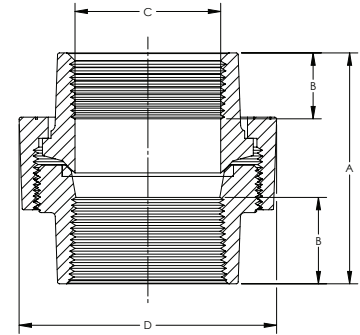
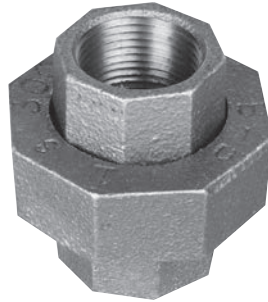
| NPS       | Overall Length A (min) | Length of Threads B (min) | Thru Hole C (min) | Width of Nut D (min) |
|-----------|------------------------|---------------------------|-------------------|----------------------|
| 1/8       | 1.26                   | 0.30                      | 0.21              | 0.93                 |
| 1/4       | 1.44                   | 0.32                      | 0.36              | 1.10                 |
| 3/8       | 1.61                   | 0.36                      | 0.52              | 1.26                 |
| 1/2       | 1.72                   | 0.43                      | 0.61              | 1.45                 |
| 3/4       | 1.94                   | 0.50                      | 0.80              | 1.71                 |
| 3/4 X 1/2 | 1.94                   | 0.50                      | 0.80              | 1.71                 |
| 1         | 2.06                   | 0.58                      | 1.00              | 2.07                 |
| 1 1/4     | 2.26                   | 0.67                      | 1.31              | 2.50                 |
| 1 1/2     | 2.41                   | 0.70                      | 1.55              | 2.82                 |
| 2         | 2.75                   | 0.75                      | 2.03              | 3.41                 |
| 2 1/2     | 3.22                   | 0.92                      | 2.38              | 4.12                 |
| 3         | 3.50                   | 0.98                      | 3.00              | 4.75                 |
| *4        | 3.85                   | 1.08                      | 4.03              | 6.00                 |



\*UL Standards not applicable to 4" size union

## WARD UNION BRASS TO IRON SEAT CLASS 250

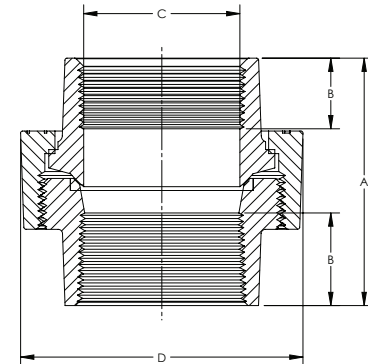
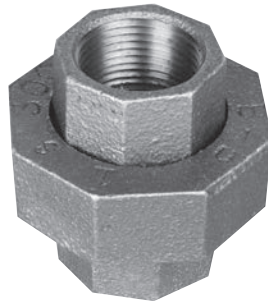
| NPS   | Overall Length A (min) | Length of Threads B (min) | Thru Hole C (min) | Width of Nut D (min) |
|-------|------------------------|---------------------------|-------------------|----------------------|
| 1/8   | 1.26                   | 0.30                      | 0.21              | 0.93                 |
| 1/4   | 1.55                   | 0.43                      | 0.30              | 1.11                 |
| 3/8   | 1.71                   | 0.47                      | 0.42              | 1.26                 |
| 1/2   | 1.18                   | 0.57                      | 0.54              | 1.45                 |
| 3/4   | 2.07                   | 0.64                      | 0.74              | 1.71                 |
| 1     | 2.31                   | 0.75                      | 0.95              | 2.07                 |
| 1 1/4 | 2.62                   | 0.84                      | 1.27              | 2.57                 |
| 1 1/2 | 2.78                   | 0.87                      | 1.50              | 2.89                 |
| 2     | 3.31                   | 1.00                      | 1.93              | 3.48                 |
| 2 1/2 | 3.52                   | 1.17                      | 2.32              | 4.15                 |
| 3     | 3.84                   | 1.23                      | 2.90              | 4.69                 |
| *4    | 4.39                   | 1.33                      | 3.82              | 6.47                 |



\*UL Standards not applicable to 4" size union

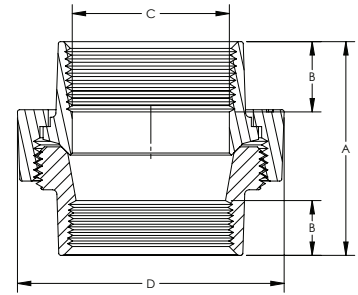
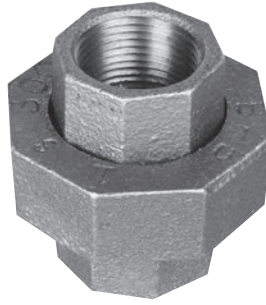
## WARD UNION BRASS TO IRON SEAT CLASS 300

| NPS   | Overall Length A (min) | Length of Threads B (min) | Thru Hole C (min) | Width of Nut D (min) |
|-------|------------------------|---------------------------|-------------------|----------------------|
| 1/8   | 1.26                   | 0.30                      | 0.21              | 1.26                 |
| 1/4   | 1.55                   | 0.43                      | 0.30              | 1.55                 |
| 3/8   | 1.71                   | 0.47                      | 0.42              | 1.71                 |
| 1/2   | 1.81                   | 0.57                      | 0.54              | 1.81                 |
| 3/4   | 2.12                   | 0.64                      | 0.74              | 2.12                 |
| 1     | 2.31                   | 0.75                      | 0.95              | 2.31                 |
| 1 1/4 | 2.66                   | 0.84                      | 1.27              | 2.66                 |
| 1 1/2 | 2.85                   | 0.87                      | 1.50              | 2.85                 |
| 2     | 2.23                   | 1.00                      | 1.93              | 3.23                 |
| 2 1/2 | 3.33                   | 1.17                      | 2.320             | 3.33                 |
| 3     | 4.09                   | 1.23                      | 2.90              | 4.09                 |
| 4     | —                      | —                         | —                 | —                    |



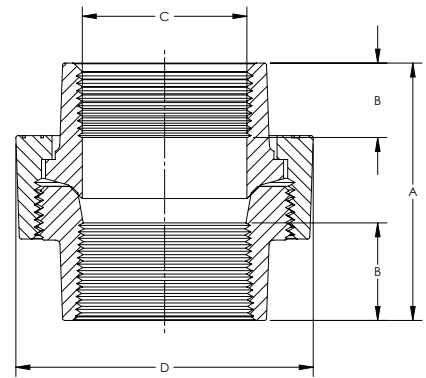
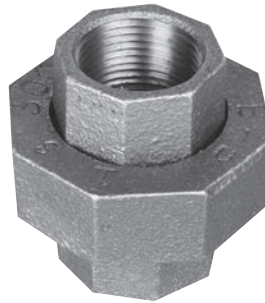
## WARD UNION IRON TO IRON SEAT CLASS 150

| NPS   | Overall Length A (min) | Length of Threads B (min) | Thru Hole C (min) | Width of Nut D (min) |
|-------|------------------------|---------------------------|-------------------|----------------------|
| 1/8   | 1.26                   | 0.30                      | 0.21              | 1.00                 |
| 1/4   | 1.44                   | 0.32                      | 0.36              | 1.25                 |
| 3/8   | 1.61                   | 0.36                      | 0.52              | 1.50                 |
| 1/2   | 1.72                   | 0.43                      | 0.61              | 1.68                 |
| 3/4   | 1.94                   | 0.50                      | 0.80              | 2.00                 |
| 1     | 2.06                   | 0.58                      | 1.00              | 2.25                 |
| 1 1/4 | 2.26                   | 0.67                      | 1.31              | 2.81                 |
| 1 1/2 | 2.41                   | 0.70                      | 1.55              | 3.06                 |
| 2     | 2.75                   | 0.75                      | 2.03              | 3.68                 |
| 2 1/2 | 3.22                   | 0.92                      | 2.38              | 4.68                 |
| 3     | 3.50                   | 0.98                      | 3.00              | 5.18                 |



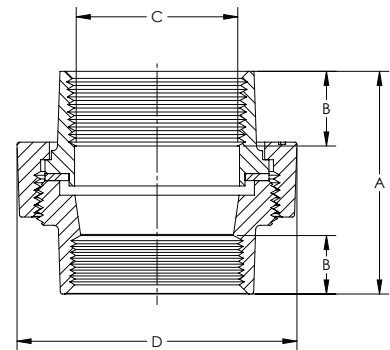
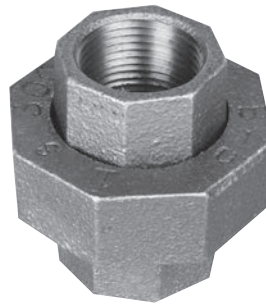
## WARD UNION IRON TO IRON SEAT CLASS 300

| NPS   | Overall Length A (min) | Length of Threads B (min) | Thru Hole C (min) | Width of Nut D (min) |
|-------|------------------------|---------------------------|-------------------|----------------------|
| 1/8   | 1.26                   | 0.30                      | 0.21              | 1.06                 |
| 1/4   | 1.55                   | 0.43                      | 0.30              | 1.30                 |
| 3/8   | 1.71                   | 0.47                      | 0.42              | 1.31                 |
| 1/2   | 1.81                   | 0.57                      | 0.54              | 1.68                 |
| 3/4   | 2.12                   | 0.64                      | 0.74              | 2.25                 |
| 1     | 2.31                   | 0.75                      | 0.95              | 2.50                 |
| 1 1/4 | 2.66                   | 0.84                      | 1.27              | 2.96                 |
| 1 1/2 | 2.85                   | 0.87                      | 1.50              | 3.28                 |
| 2     | 3.23                   | 1.00                      | 1.93              | 3.93                 |
| 2 1/2 | 3.33                   | 1.17                      | 2.32              | 4.53                 |
| 3     | 4.09                   | 1.23                      | 2.90              | 5.31                 |



## WARD GASKET TYPE UNION MALLEABLE IRON

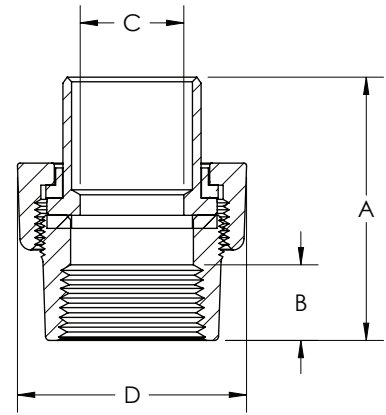
| NPS   | Overall Length A (min) | Length of Threads B (min) | Thru Hole C (min) | Width of Nut D (min) |
|-------|------------------------|---------------------------|-------------------|----------------------|
| 3/8   | 1.61                   | 0.36                      | 0.52              | 1.26                 |
| 1/2   | 1.72                   | 0.43                      | 0.61              | 1.45                 |
| 3/4   | 1.94                   | 0.50                      | 0.80              | 1.71                 |
| 1     | 2.06                   | 0.58                      | 1.00              | 2.07                 |
| 1 1/4 | 2.26                   | 0.67                      | 1.31              | 2.50                 |
| 1 1/2 | 2.41                   | 0.70                      | 1.55              | 2.82                 |
| 2     | 2.75                   | 0.75                      | 2.03              | 3.41                 |



## WARD DI-ELECTRIC UNION IRON TO BRASS

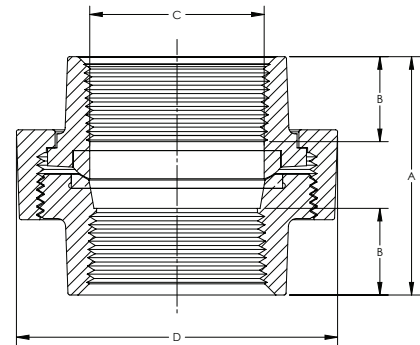
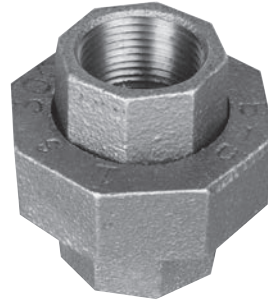
| NPS        | Overall Length A (min) | Length of Threads B (min) | Thru Hole C (min) | Width of Nut D (min) |
|------------|------------------------|---------------------------|-------------------|----------------------|
| *1/2 x 1/2 | 1.87                   | 0.57                      | 0.54              | 1.68                 |
| *3/4 x 1/2 | 1.87                   | 0.64                      | 0.74              | 1.68                 |
| *3/4 x 3/4 | 1.31                   | 0.64                      | 0.74              | 1.68                 |

\* Manufactured to WARD specifications



## WARD UNION BRASS TO BRASS SEAT CLASS 300

| NPS   | Overall Length A (min) | Length of Threads B (min) | Thru Hole C (min) | Width of Nut D (min) |
|-------|------------------------|---------------------------|-------------------|----------------------|
| 1/4   | 1.55                   | 0.43                      | 0.30              | 1.33                 |
| 3/8   | 1.71                   | 0.47                      | 0.42              | 1.50                 |
| 1/2   | 1.81                   | 0.57                      | 0.54              | 1.76                 |
| 3/4   | 2.12                   | 0.64                      | 0.74              | 2.15                 |
| 1     | 2.31                   | 0.75                      | 0.95              | 2.48                 |
| 1 1/4 | 2.66                   | 0.84                      | 1.27              | 3.02                 |
| 1 1/2 | 2.85                   | 0.87                      | 1.50              | 3.28                 |
| 2     | 2.23                   | 1.00                      | 1.93              | 3.96                 |
| 2 1/2 | 3.33                   | 1.17                      | 2.32              | 4.72                 |
| 3     | 4.09                   | 1.23                      | 2.90              | 5.37                 |
| *4    | 4.47                   | 1.33                      | 3.82              | 7.00                 |



\*UL Standards not applicable to 4" size unions

# SECTION 4

# PLUGS AND BUSHINGS

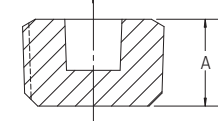
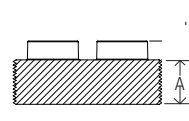
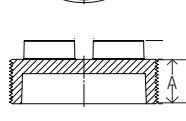
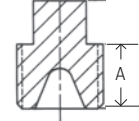
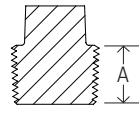
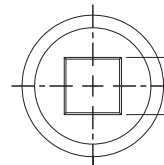
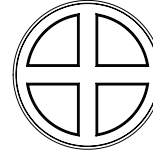
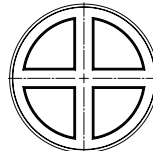
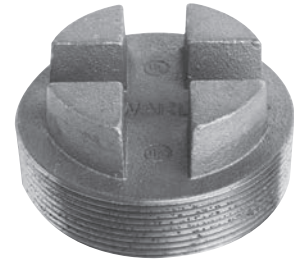
## PLUGS

| NPS   | Thread Length A (min) |
|-------|-----------------------|
| 1/8   | 0.37                  |
| 1/4   | 0.44                  |
| 3/8   | 0.48                  |
| 1/2   | 0.56                  |
| 3/4   | 0.63                  |
| 1     | 0.75                  |
| 1 1/4 | 0.80                  |
| 1 1/2 | 0.83                  |
| 2     | 0.88                  |
| 2 1/2 | 1.07                  |
| 3     | 1.13                  |
| 3 1/2 | 1.18                  |
| 4     | 1.22                  |
| 5     | 1.31                  |
| 6     | 1.40                  |
| 8     | 1.57                  |
| 10    | 1.92                  |

**WARD Plugs and Bushings** are produced in both Malleable Iron and Cast Iron grades. The iron from which they are made is held to strict formula by careful chemical analysis and control.

Tapping is done on the most modern type of threading machines. Every fitting is hand sorted and inspected to eliminate defective castings.

Ward plugs and bushings comply with the standards and specifications seen below.



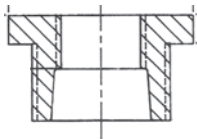
SOLID PLUG

CORED PLUG

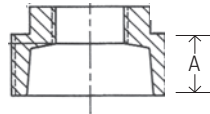
CORED BAR HEAD

SOLID BAR HEAD

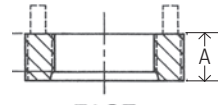
COUNTERSUNK



OUTSIDE HEAD



INSIDE HEAD



FACE

## BUSHINGS

| NPS   | External Thread Length (min) | Internal Thread Length (min) |
|-------|------------------------------|------------------------------|
| 1/4   | 0.44                         | 0.32                         |
| 3/8   | 0.48                         | 0.36                         |
| 1/2   | 0.56                         | 0.43                         |
| 3/4   | 0.63                         | 0.50                         |
| 1     | 0.75                         | 0.58                         |
| 1 1/4 | 0.80                         | 0.67                         |
| 1 1/2 | 0.83                         | 0.70                         |
| 2     | 0.88                         | 0.75                         |
| 2 1/2 | 1.07                         | 0.92                         |
| 3     | 1.13                         | 0.98                         |
| 3 1/2 | 1.18                         | 1.03                         |
| 4     | 1.22                         | 1.08                         |
| 5     | 1.31                         | 1.18                         |
| 6     | 1.40                         | 1.28                         |
| 8     | 1.57                         | —                            |
| 10    | 1.92                         | —                            |

**Material:** ASTM A197 for malleable iron  
ASTM A126 Class A Minimum for cast iron

**Dimensions:** ASME B16.14  
ANSI/ASME B1.20.1

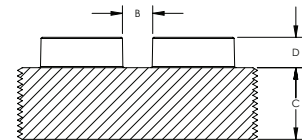
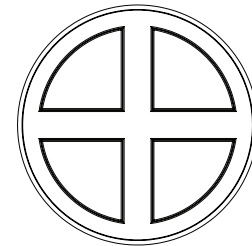
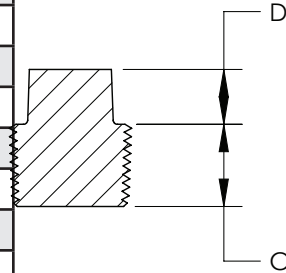
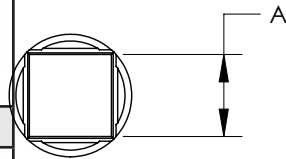
**Pressure Ratings:** ASME B16.3 for malleable iron  
ASME B16.4 for cast iron

**Coatings:** ASTM A153  
ASTM B633

**Additional Specifications:** UL, ULC, FM, NSF 61 and NSF 61 Annex G where applicable

## CAST IRON SOLID PLUGS CLASS 125

| NPS   | Nominal Width Across Flats A | Distance Between Lugs B (min) | Length of Threads C (min) | Height of Square D (min) |
|-------|------------------------------|-------------------------------|---------------------------|--------------------------|
| *1/8  | 9/32                         | —                             | 0.37                      | 0.24                     |
| *1/4  | 3/8                          | —                             | 0.44                      | 0.28                     |
| *1/2  | 9/16                         | —                             | 0.56                      | 0.38                     |
| *3/4  | 5/8                          | —                             | 0.63                      | 0.44                     |
| *3/8  | 7/16                         | —                             | 0.48                      | 0.31                     |
| 1     | 13/16                        | —                             | 0.75                      | 0.50                     |
| 1 1/4 | 15/16                        | —                             | 0.80                      | 0.56                     |
| 1 1/2 | 1 1/8                        | —                             | 0.83                      | 0.62                     |
| 2     | 1 5/16                       | —                             | 0.88                      | 0.68                     |
| 2 1/2 | 1 1/2                        | —                             | 1.07                      | 0.74                     |
| 3     | 1 11/16                      | —                             | 1.13                      | 0.80                     |
| 3 1/2 | —                            | —                             | —                         | —                        |
| + 4   | —                            | 7/8                           | 1.22                      | 1.00                     |
| + 5   | —                            | 7/8                           | 1.31                      | 1.00                     |
| + 6   | —                            | 1 1/4                         | 1.40                      | 1.25                     |
| +8    | —                            | —                             | —                         | —                        |

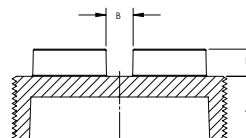
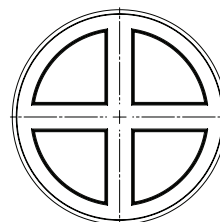
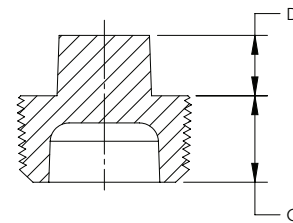
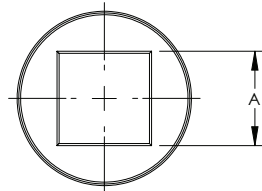


\*Made from Cast Iron or Steel

+ Bar Head

## CAST IRON CORED PLUGS CLASS 125

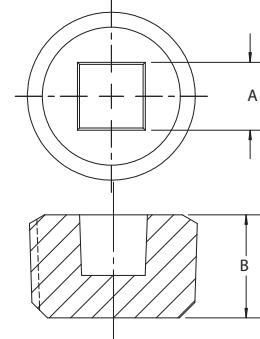
| NPS      | Nominal Width Across Flats A | Distance Between Lugs B (min) | Length of Threads C (min) | Height of Square D (min) |
|----------|------------------------------|-------------------------------|---------------------------|--------------------------|
| 1/2      | 9/16                         | ---                           | 0.56                      | 0.28                     |
| 3/4      | 5/8                          | ---                           | 0.63                      | 0.44                     |
| 1        | 13/16                        | ---                           | 0.75                      | 0.50                     |
| 1 1/4    | 15/16                        | ---                           | 0.80                      | 0.56                     |
| 1 1/2    | 1 1/8                        | ---                           | 0.83                      | 0.62                     |
| 2        | 1 5/16                       | ---                           | 0.88                      | 0.68                     |
| 2 1/2    | 1 1/2                        | ---                           | 1.07                      | 0.74                     |
| 3        | 1 11/16                      | ---                           | 1.13                      | 0.80                     |
| 3 1/2    | 1 7/8                        | ---                           | 1.18                      | 0.86                     |
| 4 SQUARE | 2 1/16                       | ---                           | 1.22                      | 0.92                     |
| + 4      | ---                          | 7/8                           | 1.22                      | 1.00                     |
| + 5      | ---                          | 7/8                           | 1.31                      | 1.00                     |
| + 6      | ---                          | 1 1/4                         | 1.40                      | 1.25                     |
| +8       | ---                          | ---                           | ---                       | ---                      |



+ Bar Head

## COUNTERSUNK PLUGS CLASS 125 AND 150

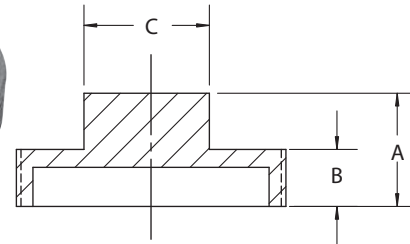
| NPS   | Nominal Size of Square A | Length of Threads B (min) |
|-------|--------------------------|---------------------------|
| +1/4  | 1/4                      | 0.44                      |
| +3/8  | 5/16                     | 0.48                      |
| 1/2   | 3/8                      | 0.56                      |
| 3/4   | 1/2                      | 0.63                      |
| 1     | 1/2                      | 0.75                      |
| 1 1/4 | 3/4                      | 0.80                      |
| 1 1/2 | 3/4                      | 0.83                      |
| 2     | 7/8                      | 0.88                      |
| 2 1/2 | 1 1/8                    | 1.07                      |
| 3     | 1 3/8                    | 1.13                      |
| 3 1/2 | 1 1/2                    | 1.18                      |



+Steel

## CAST IRON HEX HEAD CLEANOUT PLUGS CLASS 125

| NPS   | Overall Height A | Length of Threads B (min) | Nominal Width Across Flats C |
|-------|------------------|---------------------------|------------------------------|
| 1 1/4 | 1.03             | 0.53                      | 1.01                         |
| 1 1/2 | 1.02             | 0.52                      | 1.01                         |
| 2 1/2 | 1.25             | 0.62                      | 1.20                         |
| 3     | 1.37             | 0.68                      | 1.40                         |
| 4     | 1.40             | 0.77                      | 1.54                         |

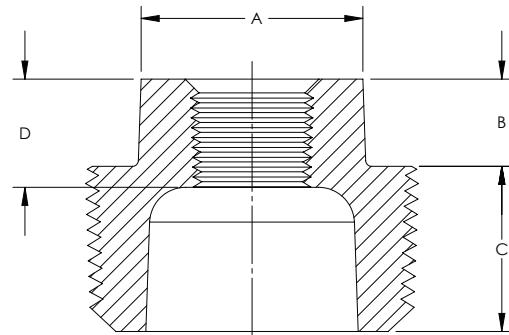
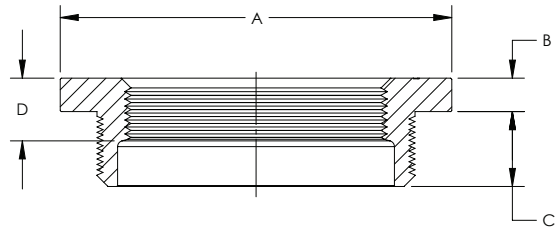


\* Manufactured to WARD specifications



# CAST IRON HEXAGON BUSHINGS CLASS 125

| NPS           | Width of Head A | Height of Head B | Length of External Threads C (min) | Length of Internal Threads D (min) | Inside or Outside Head |
|---------------|-----------------|------------------|------------------------------------|------------------------------------|------------------------|
| 1 1/4 x 3/4   | 1.76            | 0.28             | 0.80                               | 0.50                               | Outside                |
| 1 1/4 x 1/2   | 1.34            | 0.34             | 0.80                               | 0.43                               | Inside                 |
| 1 1/4 x 3/8   | 1.12            | 0.34             | 0.80                               | 0.36                               | Inside                 |
| 1 1/4 x 1/4   | 1.12            | 0.34             | 0.80                               | 0.32                               | Inside                 |
| *1 1/4 x 1/8  | 1.12            | 0.34             | 0.80                               | 0.32                               | Inside                 |
| 1 1/2 x 1     | 2.00            | 0.31             | 0.83                               | 0.58                               | Outside                |
| 1 1/2 x 3/4   | 1.63            | 0.37             | 0.83                               | 0.50                               | Inside                 |
| 1 1/2 x 1/2   | 1.34            | 0.37             | 0.83                               | 0.43                               | Inside                 |
| 1 1/2 x 3/8   | —               | —                | —                                  | —                                  | Inside                 |
| 1 1/2 x 1/4   | 1.12            | 0.37             | 0.83                               | 0.32                               | Inside                 |
| *1 1/2 x 1/8  | 1.12            | 0.37             | 0.83                               | 0.32                               | Inside                 |
| 2 x 1 1/4     | 2.48            | 0.34             | 0.88                               | 0.67                               | Outside                |
| 2 x 1         | 1.95            | 0.41             | 0.88                               | 0.58                               | Inside                 |
| 2 x 3/4       | 1.63            | 0.41             | 0.88                               | 0.50                               | Inside                 |
| 2 x 1/2       | 1.34            | 0.41             | 0.88                               | 0.43                               | Inside                 |
| 2 x 3/8       | 1.12            | 0.41             | 0.88                               | 0.36                               | Inside                 |
| 2 x 1/4       | 1.12            | 0.41             | 0.88                               | 0.32                               | Inside                 |
| *2 x 1/8      | 1.12            | 0.41             | 0.88                               | 0.32                               | Inside                 |
| 2 1/2 x 1 1/2 | 2.68            | 0.44             | 1.07                               | 0.70                               | Outside                |
| 2 1/2 x 1 1/4 | 2.39            | 0.44             | 1.07                               | 0.67                               | Inside                 |
| 2 1/2 x 1     | 1.95            | 0.44             | 1.07                               | 0.58                               | Inside                 |
| 2 1/2 x 3/4   | 1.63            | 0.44             | 1.07                               | 0.50                               | Inside                 |
| 2 1/2 x 1/2   | 1.34            | 0.44             | 1.07                               | 0.43                               | Inside                 |
| *2 1/2 x 3/8  | 1.34            | 0.44             | 1.07                               | 0.36                               | Inside                 |
| 3 x 2 1/2     | 3.86            | 0.40             | 1.13                               | 0.92                               | Outside                |
| 3 x 2         | 3.28            | 0.48             | 1.13                               | 0.75                               | Outside                |
| 3 x 1 1/2     | 2.68            | 0.48             | 1.13                               | 0.70                               | Inside                 |
| 3 x 1 1/4     | 2.390           | 0.48             | 1.13                               | 0.67                               | Inside                 |
| 3 x 1         | 1.95            | 0.48             | 1.13                               | 0.58                               | Inside                 |
| 3 x 3/4       | 1.63            | 0.48             | 1.13                               | 0.50                               | Inside                 |
| 3 x 1/2       | —               | —                | —                                  | —                                  | Inside                 |
| *3 x 1/4      | 2.68            | 0.48             | 1.13                               | 0.32                               | Inside                 |
| 3 1/2 x 2 1/2 | 3.86            | 0.52             | 1.18                               | 0.92                               | Outside                |
| 3 1/2 x 2     | 3.28            | 0.52             | 1.18                               | 0.75                               | Inside                 |

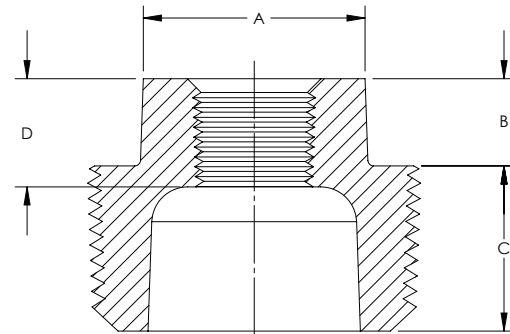
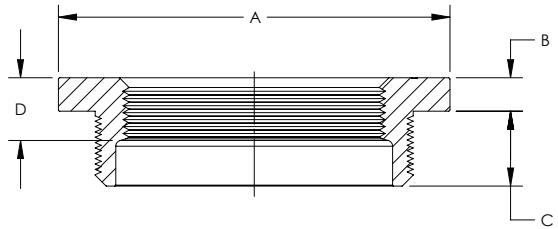


Continued on next page

\* Manufactured to WARD specifications

## CAST IRON HEXAGON BUSHINGS CLASS 125

| NPS           | Width of Head<br>A | Height of Head<br>B | Length of External Threads<br>C (min) | Length of Internal Threads<br>D (min) | Inside or Outside Head |
|---------------|--------------------|---------------------|---------------------------------------|---------------------------------------|------------------------|
| 3 1/2 x 1 1/2 | —                  | —                   | —                                     | —                                     | Inside                 |
| 3 1/2 x 1 1/4 | 2.39               | 0.52                | 1.18                                  | 0.67                                  | Inside                 |
| 3 1/2 x 1     | 1.95               | 0.52                | 1.18                                  | 0.58                                  | Inside                 |
| *3 1/2 x 3/4  | —                  | —                   | —                                     | —                                     | Inside                 |
| *3 1/2 x 1/2  | —                  | —                   | —                                     | —                                     | Inside                 |
| *3 1/2 x 1/4  | 1.95               | 0.52                | 1.18                                  | 0.32                                  | Inside                 |
| 4 x 3         | 4.62               | 0.50                | 1.22                                  | 0.98                                  | Outside                |
| 4 x 2 1/2     | 3.86               | 0.60                | 1.22                                  | 0.92                                  | Inside                 |
| 4 x 2         | 3.28               | 0.60                | 1.22                                  | 0.75                                  | Inside                 |
| 4 x 1 1/2     | 2.68               | 0.60                | 1.22                                  | 0.70                                  | Inside                 |
| 4 x 1 1/4     | 2.39               | 0.60                | 1.22                                  | 0.67                                  | Inside                 |
| 4 x 1         | 1.95               | 0.60                | 1.22                                  | 0.58                                  | Inside                 |
| *4 x 3/4      | —                  | —                   | —                                     | —                                     | Inside                 |
| *4 x 1/2      | 1.95               | 0.60                | 1.22                                  | 0.50                                  | Inside                 |
| 5 x 4         | 5.79               | 0.50                | 1.31                                  | 1.08                                  | Outside                |
| 5 x 3 1/2     | 5.20               | 0.60                | 1.31                                  | 1.03                                  | Outside                |
| 5 x 3         | 4.62               | 0.60                | 1.31                                  | 0.98                                  | Inside                 |
| 5 x 2 1/2     | 3.86               | 0.60                | 1.31                                  | 0.92                                  | Inside                 |
| 5 x 2         | 3.28               | 0.60                | 1.36                                  | 0.75                                  | Inside                 |
| *5 x 1 1/2    | 3.28               | 0.60                | 1.31                                  | 0.70                                  | Inside                 |
| *5 x 1 1/4    | 3.28               | 0.60                | 1.31                                  | 0.67                                  | Inside                 |
| 6 x 5         | 7.05               | 0.63                | 1.40                                  | 1.18                                  | Outside                |
| 6 x 4         | 5.79               | 0.75                | 1.40                                  | 1.08                                  | Inside                 |
| 6 x 3         | 4.62               | 0.75                | 1.40                                  | 0.98                                  | Inside                 |
| 6 x 2 1/2     | 3.86               | 0.75                | 1.40                                  | 0.92                                  | Inside                 |
| 6 x 2         | 3.28               | 0.75                | 1.40                                  | 0.75                                  | Inside                 |
| 8 x 6         | 8.28               | 0.83                | 1.57                                  | 1.28                                  | Outside                |
| 8 x 5         | 7.05               | 0.83                | 1.57                                  | 1.18                                  | Inside                 |
| 8 x 4         | —                  | —                   | —                                     | —                                     | Inside                 |
| 8 x 3         | —                  | —                   | —                                     | —                                     | Inside                 |

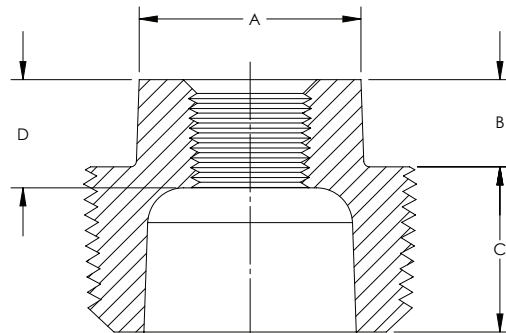
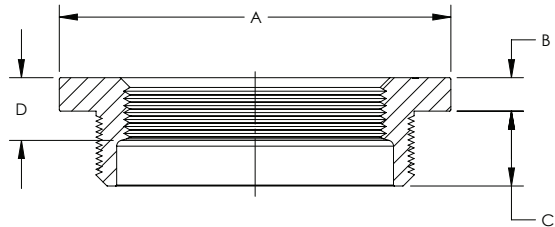


\* Manufactured to WARD specifications

# MALLEABLE IRON HEXAGON BUSHINGS CLASS 150

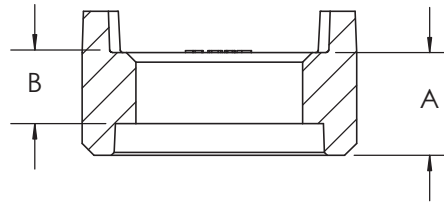
| NPS           | Width of Head A | Height of Head B | Length of External Threads C (min) | Length of Internal Threads D (min) | Inside or Outside Head |
|---------------|-----------------|------------------|------------------------------------|------------------------------------|------------------------|
| *1/4 x 1/8    | 0.64            | 0.14             | 0.44                               | 0.26                               | Outside                |
| *3/8 x 1/4    | 0.68            | 0.160            | 0.48                               | 0.40                               | Outside                |
| *3/8 x 1/8    | 0.68            | 0.16             | 0.48                               | 0.25                               | Outside                |
| *1/2 x 3/8    | 0.87            | 0.19             | 0.56                               | 0.36                               | Outside                |
| *1/2 x 1/4    | 0.87            | 0.19             | 0.56                               | 0.32                               | Outside                |
| *1/2 x 1/8    | 0.87            | 0.19             | 0.56                               | 0.25                               | Outside                |
| *3/4 x 1/2    | 1.15            | 0.22             | 0.63                               | 0.53                               | Outside                |
| *3/4 x 3/8    | 1.15            | 0.22             | 0.63                               | 0.36                               | Outside                |
| *3/4 x 1/4    | 1.15            | 0.22             | 0.63                               | 0.32                               | Outside                |
| *3/4 x 1/8    | 1.15            | 0.22             | 0.63                               | 0.25                               | Outside                |
| *1 x 3/4      | 1.42            | 0.25             | 0.75                               | 0.50                               | Outside                |
| *1 x 1/2      | 1.42            | 0.25             | 0.75                               | 0.43                               | Outside                |
| *1 x 3/8      | 1.12            | 0.30             | 0.75                               | 0.36                               | Inside                 |
| *1 x 1/4      | 1.12            | 0.30             | 0.75                               | 0.32                               | Inside                 |
| *1 x 1/8      | 1.12            | 0.30             | 0.75 <td 0.25                      | Inside                             |                        |
| 1 1/4 x 1     | 1.76            | 0.28             | 0.80                               | 0.58                               | Outside                |
| 1 1/2 x 1 1/4 | 2.00            | 0.31             | 0.83                               | 0.77                               | Outside                |
| 2 x 1 1/2     | 2.48            | 0.34             | 0.88                               | 0.70                               | Outside                |
| 2 1/2 x 2     | 2.98            | 0.37             | 1.07                               | 0.75                               | Outside                |
| 3 1/2 x 3     | 4.62            | 0.43             | 1.18                               | 0.98                               | Outside                |
| 4 x 3 1/2     | 5.20            | 0.50             | 1.22                               | 1.03                               | Outside                |

\* Made from Malleable Iron or Steel



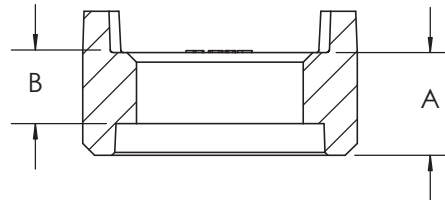
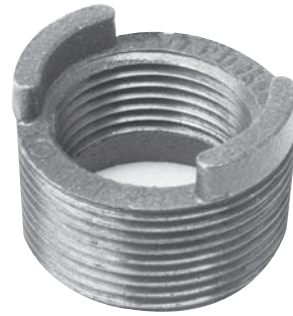
## CAST IRON FLUSH BUSHINGS CLASS 125

| NPS           | Length of External Threads A (min) | Length of Internal Threads B (min) |
|---------------|------------------------------------|------------------------------------|
| 1 1/4 x 3/4   | 0.80                               | 0.500                              |
| 1 1/4 x 1/2   | 0.80                               | 0.43                               |
| 1 1/2 x 1     | 0.83                               | 0.58                               |
| 1 1/2 x 3/4   | 0.83                               | 0.50                               |
| 1 1/2 x 1/2   | 0.83                               | 0.43                               |
| 2 x 1 1/4     | 0.88                               | 0.67                               |
| 2 x 1         | 0.88                               | 0.58                               |
| 2 x 3/4       | 0.88                               | 0.50                               |
| 2 x 1/2       | 0.88                               | 0.43                               |
| 2 1/2 x 1 1/2 | 1.07                               | 0.70                               |
| 2 1/2 x 1 1/4 | 1.07                               | 0.67                               |
| 2 1/2 x 1     | ---                                | ---                                |
| 2 1/2 x 3/4   | ---                                | ---                                |
| 3 x 2         | 1.13                               | 0.75                               |
| 3 x 1 1/2     | 1.13                               | 0.70                               |
| 3 x 1 1/4     | 1.13                               | 0.67                               |
| 3 x 1         | 1.13                               | 0.58                               |
| 3 x 3/4       | 1.13                               | 0.50                               |
| 3 1/2 x 2 1/2 | 1.18                               | 0.92                               |
| 3 1/2 x 2     | 1.18                               | 0.75                               |
| 3 1/2 x 1 1/2 | 1.18                               | 0.70                               |
| 4 x 3         | 1.22                               | 0.98                               |
| 4 x 2 1/2     | 1.22                               | 0.92                               |
| 4 x 2         | 1.22                               | 0.75                               |
| 5 x 4         | 1.31                               | 1.08                               |
| 5 x 3         | 1.31                               | 1.03                               |
| 6 x 5         | 1.40                               | 1.18                               |
| 6 x 4         | 1.40                               | 1.08                               |
| 8 x 6         | 1.57                               | 1.28                               |
| 8 x 5         | 1.57                               | 1.18                               |



## MALLEABLE IRON FLUSH BUSHINGS CLASS 150

| NPS           | Overall Height A | Length of External Threads B (min) |
|---------------|------------------|------------------------------------|
| +1/4 x 1/8    | 0.44             | 0.26                               |
| +3/8 x 1/4    | 0.48             | 0.40                               |
| +1/2 x 3/8    | 0.56             | 0.41                               |
| +1/2 x 1/4    | 0.56             | 0.32                               |
| +1/2 x 1/8    | 0.56             | 0.25                               |
| +3/4 x 1/2    | 0.63             | 0.53                               |
| +3/4 x 3/8    | 0.63             | 0.36                               |
| +3/4 x 1/4    | 0.63             | 0.32                               |
| 1 x 3/4       | 0.75             | 0.50                               |
| 1 x 1/2       | 0.75             | 0.43                               |
| 1 x 3/8       | 0.75             | 0.43                               |
| 1 x 1/4       | 0.75             | 0.36                               |
| 1 1/4 x 1     | 0.80             | 0.58                               |
| 1 1/2 x 1 1/4 | 0.83             | 0.77                               |
| 2 x 1 1/2     | 0.88             | 0.70                               |
| 2 1/2 x 2     | 1.07             | 0.75                               |
| 3 x 2 1/2     | 1.13             | 0.92                               |
| 3 1/2 x 3     | 1.18             | 0.98                               |
| 4 x 3 1/2     | 1.22             | 1.03                               |



+Steel

## STEEL HEX SOCKET PLUGS

| NPS |
|-----|
| 1/8 |
| 1/4 |
| 3/8 |
| 1/2 |
| 3/4 |

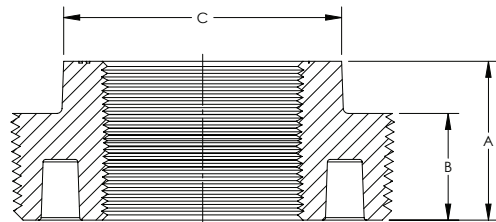
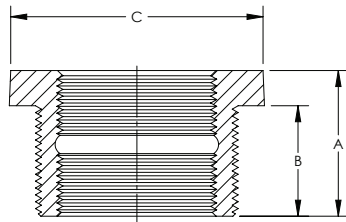


## CAST IRON DOUBLE TAP TANK BUSHINGS (Heavy Type Only)

| NPS                | Overall Height A | Length of External Threads B (min) | Width of Head C | Inside or Outside Head |
|--------------------|------------------|------------------------------------|-----------------|------------------------|
| *1 x 3/4 x 3/4     | 1.57             | 1.16                               | ---             | ---                    |
| *1 x 1/2 x 1/2     | 1.57             | 1.16                               | 1.46            | Outside                |
| *1 1/2 x 1 x 1     | 1.58             | 1.16                               | 2.02            | Outside                |
| *2 x 1 1/2 x 1 1/2 | 1.74             | 1.33                               | 2.59            | Outside                |
| *2 x 1 1/4 x 1 1/4 | 1.77             | 1.33                               | 2.59            | Outside                |
| *2 x 1 x 1         | 1.57             | 1.16                               | 2.55            | Outside                |
| *2 x 3/4 x 3/4     | 1.57             | 1.16                               | 2.55            | Outside                |
| *2 x 1/2 x 1/2     | 1.57             | 1.16                               | 2.55            | Outside                |
| *2 x 3/8 x 3/8     | 1.57             | 1.16                               | 2.55            | Outside                |
| *3 x 2 x 2         | 2.31             | 1.72                               | 3.91            | Outside                |
| *3 x 1 x 1         | 2.31             | 1.72                               | 3.91            | Outside                |
| *4 x 3 x 3         | 2.30             | 1.72                               | 4.67            | Outside                |
| *4 x 2 1/2 x 2 1/2 | 2.30             | 1.55                               | 3.30            | Outside                |
| *4 x 2 x 2         | 2.30             | 1.55                               | 3.30            | Inside                 |
| *4 x 1 1/2 x 1 1/2 | 2.30             | 1.55                               | 3.30            | Inside                 |
| *4 x 1 x 1         | 2.30             | 1.55                               | 3.30            | Inside                 |



\* Manufactured to WARD specifications







**WARD Top Beam clamps** and "C" clamps are manufactured from malleable iron with hardened steel cup point set screws and lock nuts. The finish is either black or galvanized.

Top Beam clamps are recommended for use under roof installations with bar joist type construction, or for attachment to the top flange of steel shapes.

"C" clamps are recommended for attachment to American Standard I-Beams and wide flange beams, where thickness of flange does not exceed .75 inches.

Care should be taken not to overtighten the set screw.

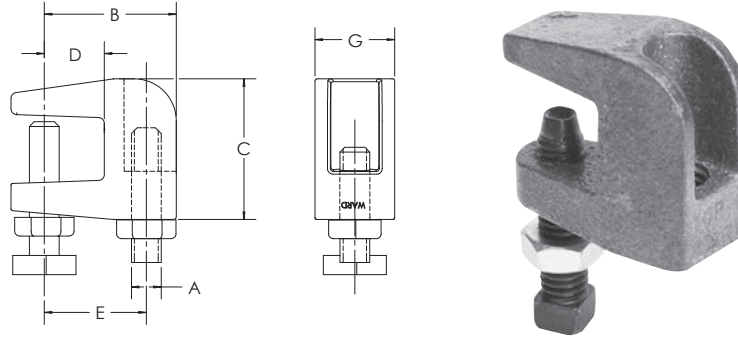
**Material:** ASTM A197

**Coatings:** ASTM A153  
ASTM B633

**Additional Specifications:** UL, ULC AND FM where applicable

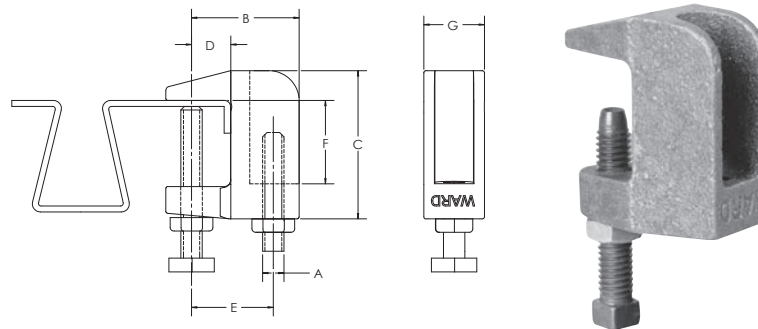
## MALLEABLE IRON SMALL MOUTH TOP BEAM CLAMP

| NPS | Thread Size | Recommended Pipe Size | Type  | Dim A | Dim B | Dim C | Dim D | Dim E | Dim F | Dim G |
|-----|-------------|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| 3/8 | 3/8 - 16UNC | 3/4 - 4               | SMALL | 0.37  | 1.37  | 1.50  | 0.62  | 1.06  | 0.75  | 0.75  |
| 1/2 | 1/2 13UNC   | 5 - 8                 | SMALL | 0.50  | 1.50  | 1.62  | 0.62  | 1.18  | 0.75  | 0.87  |



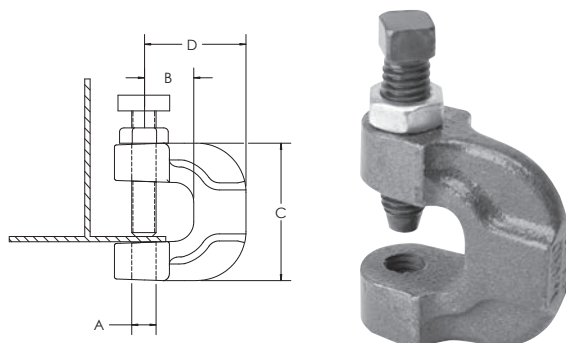
## MALLEABLE IRON LARGE MOUTH TOP BEAM CLAMP

| NPS | Thread Size | Recommended Pipe Size | Type  | Dim A | Dim B | Dim C | Dim D | Dim E | Dim F | Dim G |
|-----|-------------|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| 3/8 | 3/8- 16UNC  | 3/4 - 4               | LARGE | 0.37  | 1.56  | 1.50  | 0.62  | 1.06  | 0.75  | 0.98  |
| 1/2 | 1/2- 13UNC  | 5 - 8                 | LARGE | 0.500 | 1.56  | 1.62  | 0.62  | 1.18  | 0.75  | 0.98  |



## MALLEABLE IRON "C" CLAMP

| NPS | Thread Size | Recommended Pipe Size | Type  | Dim A | Dim B | Dim C | Dim D |
|-----|-------------|-----------------------|-------|-------|-------|-------|-------|
| 3/8 | 3/8 -16UNC  | 3/4 - 2               | LARGE | 0.37  | 0.625 | 1.750 | 1.30  |
| 1/2 | 1/2-13UNC   | 2 1/2 - 4             | LARGE | 0.50  | 0.625 | 1.750 | 1.30  |



## SECTION 6 STANDARD CAST IRON PIPE FITTINGS CLASS 125, 250



The iron from which Class 125 cast iron fittings are made is held to strict formula by careful chemical analysis and control.

Tapping is done on the most modern machines. All tappings are to USA Standards for iron pipe threads. Straightness and correct depth of threads is assured through continuous capable inspection, by careful trained inspectors.

Every fitting is hand sorted and inspected to eliminate defective castings.

WARD fittings are made to specifications published as American National Standards for pipe fittings.

A chamfer is cut or cast in all openings, permitting easy entrance of pipe and preventing damage to the first thread in handling and threading.

Because of the close attention paid to formula control and the use of modern precision equipment we are able to produce castings of rugged strength and the ability to make a water tight seal.

| NPS   | O.D. of Band (min) | Thread Length (min) | Metal Thickness (min) |
|-------|--------------------|---------------------|-----------------------|
| 1/4   | 0.97               | 0.36                | 0.11                  |
| 3/8   | 1.16               | 0.40                | 0.12                  |
| 1/2   | 1.38               | 0.47                | 0.13                  |
| 3/4   | 1.67               | 0.54                | 0.15                  |
| 1     | 1.99               | 0.62                | 0.17                  |
| 1 1/4 | 2.43               | 0.71                | 0.18                  |
| 1 1/2 | 2.72               | 0.74                | 0.20                  |
| 2     | 3.32               | 0.79                | 0.22                  |
| 2 1/2 | 3.90               | 0.96                | 0.24                  |
| 3     | 4.66               | 1.02                | 0.26                  |
| 3 1/2 | 5.24               | 1.07                | 0.28                  |
| 4     | 5.83               | 1.12                | 0.31                  |

### TEMPERATURE-PRESSURE RATING

| Temp F°    | PSI         |              |
|------------|-------------|--------------|
|            | CLASS 125   | CLASS 250    |
| -20 TO 150 | 175         | 400          |
| 200        | 165         | 370          |
| 250        | 150         | 340          |
| 300        | 140         | 310          |
| 350        | 125 (Note1) | 300          |
| 400        | —           | 250 (Note 2) |

Notes:

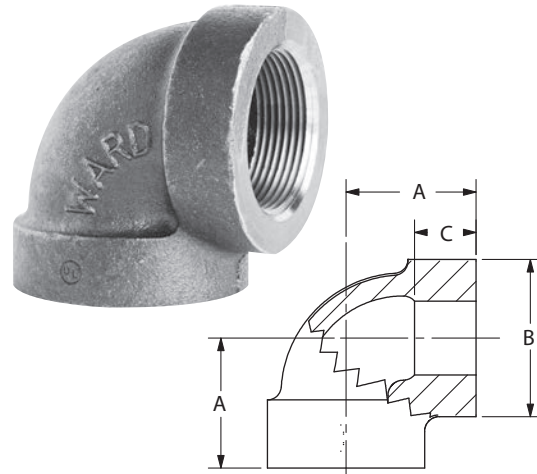
1) Permissible for service temperature up to 360° F reflecting temperature of saturated steam at 125 psi.

2) Permissible for service temperature up to 406° F reflecting temperature of saturated steam at 250 psig.

|                                   |                                                                    |
|-----------------------------------|--------------------------------------------------------------------|
| <b>Material:</b>                  | <b>ASTM A126 Class A Minimum</b>                                   |
| <b>Dimensions:</b>                | <b>ANSI/ASME B16.4<br/>ANSI/ASME B1.20.1</b>                       |
| <b>Pressure Ratings:</b>          | <b>ANSI/ASME B16.4</b>                                             |
| <b>Coatings:</b>                  | <b>ASTM A153<br/>ASTM B633</b>                                     |
| <b>Additional Specifications:</b> | <b>UL, ULC, FM, NSF 61 and<br/>NSF 61 Annex G where applicable</b> |

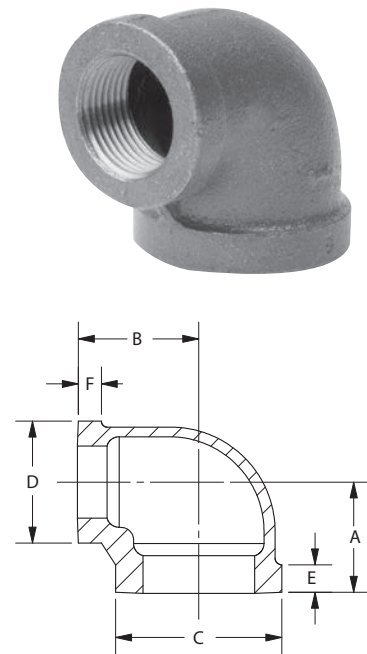
## CAST IRON 90° STRAIGHT ELL CLASS 125

| NPS   | Center to End A | Outside Dia. of Band B (min) | Thread Length C (min) | Take Out |
|-------|-----------------|------------------------------|-----------------------|----------|
| 1/4   | 0.81            | 0.93                         | 0.32                  | 0.408    |
| 3/8   | 0.95            | 1.12                         | 0.36                  | 0.5      |
| 1/2   | 1.12            | 1.34                         | 0.43                  | 0.58     |
| 3/4   | 1.31            | 1.63                         | 0.50                  | 0.76     |
| 1     | 1.50            | 1.95                         | 0.58                  | 0.81     |
| 1 1/4 | 1.75            | 2.39                         | 0.67                  | 1.04     |
| 1 1/2 | 1.94            | 2.68                         | 0.70                  | 1.21     |
| 2     | 2.25            | 3.28                         | 0.75                  | 1.49     |
| 2 1/2 | 2.70            | 3.86                         | 0.92                  | 1.56     |
| 3     | 3.08            | 4.62                         | 0.98                  | 1.88     |
| 3 1/2 | 3.42            | 5.20                         | 1.03                  | 2.17     |
| 4     | 3.79            | 5.79                         | 1.08                  | 2.49     |
| 5     | —               | —                            | —                     | —        |
| 6     | —               | —                            | —                     | —        |
| 8     | —               | —                            | —                     | —        |



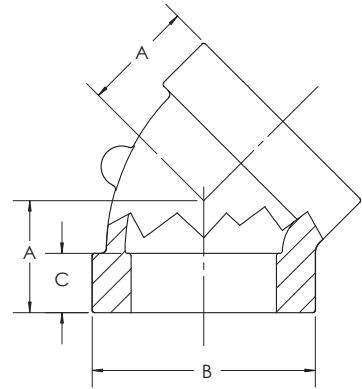
## CAST IRON 90° REDUCING ELL CLASS 125

| NPS           | Center to End A | Center to End B | Outside Dia. of Band C (min) | Outside Dia. of Band D (min) | Length of Threads E (min) | Length of Threads F (min) | Take Out | Take Out |
|---------------|-----------------|-----------------|------------------------------|------------------------------|---------------------------|---------------------------|----------|----------|
| 1/2 x 3/8     | —               | —               | —                            | —                            | —                         | —                         | —        | —        |
| 1/2 x 1/4     | —               | —               | —                            | —                            | —                         | —                         | —        | —        |
| 3/4 x 1/2     | 1.20            | 1.22            | 1.63                         | 1.34                         | 0.50                      | 0.43                      | 0.6      | 0.68     |
| *3/4 x 3/8    | 1.20            | 1.22            | 1.63                         | 1.12                         | 0.50                      | 0.36                      | 0.6      | 0.81     |
| 1 x 3/4       | 1.37            | 1.45            | 1.95                         | 1.63                         | 0.58                      | 0.50                      | 0.6      | 0.90     |
| 1 x 1/2       | 1.26            | 1.36            | 1.95                         | 1.34                         | 0.58                      | 0.43                      | 0.5      | 0.82     |
| 1 1/4 x 1     | 1.58            | 1.67            | 2.39                         | 1.95                         | 0.67                      | 0.58                      | 0.8      | 0.98     |
| 1 1/4 x 3/4   | 1.45            | 1.62            | 2.39                         | 1.63                         | 0.67                      | 0.50                      | 0.7      | 1.07     |
| 1 1/4 x 1/2   | 1.34            | 1.53            | 2.39                         | 1.34                         | 0.67                      | 0.43                      | 0.6      | 0.99     |
| 1 1/2 x 1 1/4 | 1.82            | 1.88            | 2.68                         | 2.39                         | 0.70                      | 0.67                      | 1.09     | 1.17     |
| 1 1/2 x 1     | 1.65            | 1.80            | 2.68                         | 1.95                         | 0.70                      | 0.58                      | 0.92     | 1.11     |
| 1 1/2 x 3/4   | 1.52            | 1.75            | 2.68                         | 1.63                         | 0.70                      | 0.50                      | 0.79     | 1.20     |
| 1 1/2 x 1/2   | 1.41            | 1.66            | 2.68                         | 1.34                         | 0.70                      | 0.43                      | 0.79     | 1.21     |
| 2 x 1 1/2     | 2.02            | 2.16            | 3.28                         | 2.68                         | 0.75                      | 0.70                      | 1.26     | 1.43     |
| 2 x 1 1/4     | 1.90            | 2.10            | 3.28                         | 2.39                         | 0.75                      | 0.67                      | 1.14     | 1.39     |
| 2 x 1         | 1.73            | 2.02            | 3.28                         | 1.95                         | 0.75                      | 0.58                      | 0.97     | 1.33     |
| 2 x 3/4       | 1.60            | 1.97            | 3.28                         | 1.63                         | 0.75                      | 0.50                      | 0.84     | 1.42     |
| 2 x 1/2       | 1.60            | 1.97            | 3.28                         | 1.34                         | 0.75                      | 0.43                      | 0.84     | 1.43     |
| 2 1/2 x 2     | 2.39            | 2.60            | 3.86                         | 3.28                         | 0.92                      | 0.75                      | 1.25     | 1.84     |
| 2 1/2 x 1 1/2 | 2.16            | 2.51            | 3.86                         | 2.68                         | 0.92                      | 0.70                      | 1.02     | 1.78     |
| 2 1/2 x 1 1/4 | 2.04            | 2.45            | 3.86                         | 2.39                         | 0.92                      | 0.67                      | 0.90     | 1.74     |
| 2 1/2 x 1     | 1.87            | 2.37            | 3.86                         | 1.95                         | 0.92                      | 0.58                      | 0.73     | 1.68     |
| *2 1/2 x 3/4  | 1.87            | 2.37            | 3.86                         | 1.63                         | 0.92                      | 0.50                      | 0.73     | 1.82     |
| 3 x 2 1/2     | 2.83            | 2.99            | 4.62                         | 3.86                         | 0.98                      | 0.92                      | 1.63     | 1.85     |
| 3 x 2         | 2.52            | 2.89            | 4.62                         | 3.28                         | 0.98                      | 0.75                      | 1.32     | 2.13     |
| 3 x 1 1/2     | 2.29            | 2.80            | 4.62                         | 2.68                         | 0.98                      | 0.70                      | 1.32     | 2.16     |
| 3 x 1 1/4     | 2.17            | 2.74            | 4.62                         | 2.39                         | 0.98                      | 0.67                      | 0.97     | 2.03     |
| *3 x 1        | 2.17            | 2.74            | 4.62                         | 1.95                         | 0.98                      | 0.58                      | 0.97     | 2.05     |
| 3 1/2 x 3     | —               | —               | —                            | —                            | —                         | —                         | —        | —        |
| 4 x 3 1/2     | 3.54            | 3.69            | 5.79                         | 5.20                         | 1.08                      | 1.03                      | 2.24     | 2.44     |
| 4 x 3         | 3.30            | 3.60            | 5.79                         | 4.62                         | 1.08                      | 0.98                      | 2.00     | 2.40     |
| 4 x 2 1/2     | 3.05            | 3.51            | 5.79                         | 3.86                         | 1.08                      | 0.92                      | 2.00     | 2.46     |
| 4 x 2         | 2.74            | 3.41            | 5.79                         | 3.28                         | 1.08                      | 0.75                      | 1.44     | 2.65     |
| *4 x 1 1/2    | 2.74            | 3.41            | 5.79                         | 2.68                         | 1.08                      | 0.70                      | 1.44     | 2.68     |
| 5 x 4         | —               | —               | —                            | —                            | —                         | —                         | —        | —        |
| 6 x 4         | —               | —               | —                            | —                            | —                         | —                         | —        | —        |
| 6 x 3         | —               | —               | —                            | —                            | —                         | —                         | —        | —        |



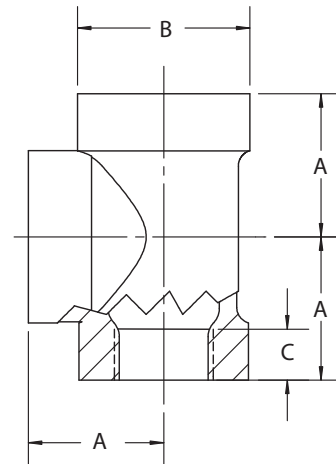
## CAST IRON 45° ELL CLASS 125

| NPS   | Center to End A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|-----------------|------------------------------|---------------------------|----------|
| 1/4   | —               | —                            | —                         | —        |
| 3/8   | —               | —                            | —                         | —        |
| 1/2   | 0.88            | 1.34                         | 0.43                      | 0.34     |
| 3/4   | 0.98            | 1.63                         | 0.50                      | 0.43     |
| 1     | 1.12            | 1.95                         | 0.58                      | 0.43     |
| 1 1/4 | 1.29            | 2.39                         | 0.67                      | 0.58     |
| 1 1/2 | 1.43            | 2.68                         | 0.70                      | 0.70     |
| 2     | 1.68            | 3.28                         | 0.75                      | 0.92     |
| 2 1/2 | 1.95            | 3.86                         | 0.92                      | 0.81     |
| 3     | 2.17            | 4.62                         | 0.98                      | 0.97     |
| 3 1/2 | —               | —                            | —                         | —        |
| 4     | 2.61            | 5.79                         | 1.08                      | 1.31     |
| 5     | —               | —                            | —                         | —        |
| 6     | —               | —                            | —                         | —        |

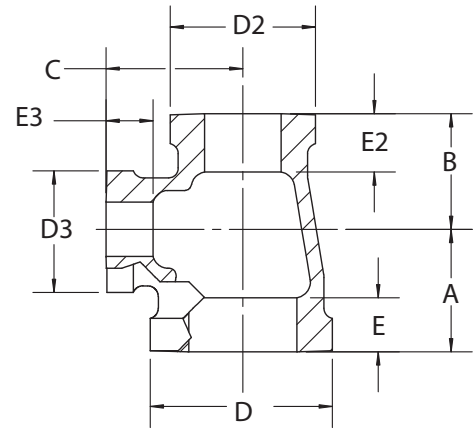


## CAST IRON STRAIGHT TEE CLASS 125

| NPS   | Center to End A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|-----------------|------------------------------|---------------------------|----------|
| 1/4   | —               | —                            | —                         | —        |
| 3/8   | 0.95            | 1.12                         | 0.36                      | 0.54     |
| 1/2   | 1.12            | 1.34                         | 0.43                      | 0.58     |
| 3/4   | 1.31            | 1.63                         | 0.50                      | 0.76     |
| 1     | 1.50            | 1.95                         | 0.58                      | 0.81     |
| 1 1/4 | 1.75            | 2.39                         | 0.67                      | 1.04     |
| 1 1/2 | 1.94            | 2.68                         | 0.70                      | 1.21     |
| 2     | 2.25            | 3.28                         | 0.75                      | 1.49     |
| 2 1/2 | 2.70            | 3.86                         | 0.92                      | 1.56     |
| 3     | 3.08            | 4.62                         | 0.98                      | 1.88     |
| 3 1/2 | 3.42            | 5.20                         | 1.03                      | 2.17     |
| 4     | 3.79            | 5.79                         | 1.08                      | 2.49     |
| 5     | —               | —                            | —                         | —        |
| 6     | —               | —                            | —                         | —        |



# CAST IRON REDUCING TEES CLASS 125



| NPS                 | Center to End A | Center to End B | Center to End C | Outside Dia. of Band D (min) | Outside Dia. of Band D2 (min) | Outside Dia. of Band D3 (min) | Length of Threads E (min) | Length of Threads E2 (min) | Length of Threads E3 (min) | Take Out | Take Out | Take Out |
|---------------------|-----------------|-----------------|-----------------|------------------------------|-------------------------------|-------------------------------|---------------------------|----------------------------|----------------------------|----------|----------|----------|
| 1/2 x 1/2 x 3/8     | 1.04            | 1.04            | 1.03            | 1.34                         | 1.34                          | 1.12                          | 0.43                      | 0.43                       | 0.36                       | 0.50     | 0.50     | 0.62     |
| 1/2 x 1/2 x 1/4     | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| *1/2 x 3/8 x 1/2    | 1.12            | 1.12            | 1.12            | 1.34                         | 1.12                          | 1.34                          | 0.43                      | 0.36                       | 0.43                       | 0.58     | 0.71     | 0.58     |
| *1/2 x 3/8 x 3/8    | 1.12            | 1.12            | 1.12            | 1.34                         | 1.12                          | 1.12                          | 0.43                      | 0.36                       | 0.36                       | 0.58     | 0.71     | 0.71     |
| *3/8 x 3/8 x 1/2    | 1.12            | 1.12            | 1.12            | 1.12                         | 1.12                          | 1.34                          | 0.36                      | 0.36                       | 0.43                       | 0.71     | 0.71     | 0.58     |
| 3/4 x 3/4 x 1/2     | 1.20            | 1.20            | 1.22            | 1.63                         | 1.63                          | 1.34                          | 0.50                      | 0.50                       | 0.43                       | 0.65     | 0.65     | 0.68     |
| 3/4 x 3/4 x 3/8     | 1.12            | 1.12            | 1.13            | 1.63                         | 1.63                          | 1.12                          | 0.50                      | 0.50                       | 0.36                       | 0.57     | 0.57     | 0.72     |
| 3/4 x 3/4 x 1/4     | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 3/4 x 1/2 x 3/4     | 1.31            | 1.22            | 1.31            | 1.63                         | 1.34                          | 1.63                          | 0.50                      | 0.43                       | 0.50                       | 0.76     | 0.68     | 0.76     |
| 3/4 x 1/2 x 1/2     | 1.20            | 1.12            | 1.22            | 1.63                         | 1.34                          | 1.34                          | 0.50                      | 0.43                       | 0.43                       | 0.65     | 0.58     | 0.68     |
| 1/2 x 1/2 x 3/4     | 1.22            | 1.22            | 1.20            | 1.340                        | 1.340                         | 1.630                         | 0.430                     | 0.430                      | 0.500                      | 0.68     | 0.68     | 0.65     |
| 1 x 1 x 3/4         | 1.37            | 1.37            | 1.45            | 1.95                         | 1.95                          | 1.63                          | 0.58                      | 0.58                       | 0.50                       | 0.68     | 0.68     | 0.90     |
| 1 x 1 x 1/2         | 1.26            | 1.26            | 1.36            | 1.95                         | 1.95                          | 1.34                          | 0.58                      | 0.58                       | 0.43                       | 0.57     | 0.57     | 0.82     |
| 1 x 1 x 3/8         | 1.18            | 1.18            | 1.27            | 1.95                         | 1.95                          | 1.12                          | 0.58                      | 0.58                       | 0.36                       | 0.49     | 0.49     | 0.86     |
| 1 x 1 x 1/4         | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 1 x 3/4 x 1         | 1.50            | 1.45            | 1.50            | 1.95                         | 1.63                          | 1.95                          | 0.58                      | 0.50                       | 0.58                       | 0.81     | 0.90     | 0.81     |
| 1 x 3/4 x 3/4       | 1.37            | 1.31            | 1.45            | 1.95                         | 1.63                          | 1.63                          | 0.58                      | 0.50                       | 0.50                       | 0.68     | 0.76     | 0.90     |
| 1 x 3/4 x 1/2       | 1.26            | 1.20            | 1.36            | 1.95                         | 1.63                          | 1.34                          | 0.58                      | 0.50                       | 0.43                       | 0.57     | 0.65     | 0.82     |
| 1 x 1/2 x 1         | 1.50            | 1.36            | 1.50            | 1.95                         | 1.34                          | 1.95                          | 0.58                      | 0.43                       | 0.58                       | 0.81     | 0.82     | 0.81     |
| 1 x 1/2 x 3/4       | 1.37            | 1.22            | 1.45            | 1.95                         | 1.34                          | 1.63                          | 0.58                      | 0.43                       | 0.50                       | 0.68     | 0.68     | 0.90     |
| 1 x 1/2 x 1/2       | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 1 x 3/8 x 1         | 1.50            | 1.27            | 1.50            | 1.95                         | 1.12                          | 1.95                          | 0.58                      | 0.36                       | 0.58                       | 0.81     | 0.86     | 0.81     |
| *1 x 1/4 x 1        | 1.50            | 1.20            | 1.50            | 1.95                         | 0.93                          | 1.95                          | 0.58                      | 0.32                       | 0.58                       | 0.81     | 0.79     | 0.81     |
| 3/4 x 3/4 x 1       | 1.45            | 1.45            | 1.37            | 1.63                         | 1.63                          | 1.95                          | 0.50                      | 0.50                       | 0.58                       | 0.90     | 0.90     | 0.68     |
| *3/4 x 1/2 x 1      | 1.45            | 1.45            | 1.37            | 1.63                         | 1.34                          | 1.95                          | 0.50                      | 0.43                       | 0.58                       | 0.90     | 0.91     | 0.68     |
| 1/2 x 1/2 x 1       | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 1 1/4 x 1 1/4 x 1   | 1.58            | 1.58            | 1.67            | 2.39                         | 2.39                          | 1.95                          | 0.67                      | 0.67                       | 0.58                       | 0.87     | 0.87     | 0.98     |
| 1 1/4 x 1 1/4 x 3/4 | 1.45            | 1.45            | 1.62            | 2.39                         | 2.39                          | 1.63                          | 0.67                      | 0.67                       | 0.50                       | 0.74     | 0.74     | 1.07     |
| 1 1/4 x 1 1/4 x 1/2 | 1.34            | 1.34            | 1.53            | 2.39                         | 2.39                          | 1.34                          | 0.67                      | 0.67                       | 0.43                       | 0.63     | 0.63     | 0.99     |
| 1 1/4 x 1 1/4 x 1/8 | ---             | ---             | ---             | ---                          | ---                           | ---                           | ---                       | ---                        | ---                        | ---      | ---      | ---      |
| 1 1/4 x 1 x 1 1/4   | 1.75            | 1.67            | 1.75            | 2.39                         | 1.95                          | 2.39                          | 0.67                      | 0.58                       | 0.67                       | 1.04     | 0.98     | 1.04     |
| 1 1/4 x 1 x 1       | 1.58            | 1.50            | 1.67            | 2.39                         | 1.95                          | 1.95                          | 0.67                      | 0.58                       | 0.58                       | 0.87     | 0.81     | 0.98     |
| 1 1/4 x 1 x 3/4     | 1.45            | 1.37            | 1.62            | 2.39                         | 1.95                          | 1.63                          | 0.67                      | 0.58                       | 0.50                       | 0.74     | 0.68     | 1.07     |

\* Manufactured to WARD specifications

## CAST IRON REDUCING TEE CLASS 125

| NPS                   | Center to End A | Center to End B | Center to End C | Outside Dia. of Band D (min) | Outside Dia. of Band D2 (min) | Outside Dia. of Band D3 (min) | Length of Threads E (min) | Length of Threads E2 (min) | Length of Threads E3 (min) | Take Out | Take Out | Take Out |
|-----------------------|-----------------|-----------------|-----------------|------------------------------|-------------------------------|-------------------------------|---------------------------|----------------------------|----------------------------|----------|----------|----------|
| 1 1/4 x 1 x 1/2       | 1.34            | 1.26            | 1.53            | 2.39                         | 1.95                          | 1.34                          | 0.67                      | 0.58                       | 0.43                       | 0.63     | 0.57     | 0.99     |
| 1 1/4 x 3/4 x 1 1/4   | 1.75            | 1.62            | 1.75            | 2.39                         | 1.63                          | 2.39                          | 0.67                      | 0.50                       | 0.67                       | 1.04     | 1.07     | 1.04     |
| 1 1/4 x 3/4 x 1       | 1.58            | 1.45            | 1.67            | 2.39                         | 1.63                          | 1.95                          | 0.67                      | 0.50                       | 0.58                       | 0.87     | 0.90     | 0.98     |
| 1 1/4 x 3/4 x 3/4     | 1.45            | 1.31            | 1.62            | 2.39                         | 1.63                          | 1.63                          | 0.67                      | 0.50                       | 0.50                       | 0.74     | 0.76     | 1.07     |
| *1 1/4 x 3/4 x 1/2    | 1.45            | 1.31            | 1.62            | 2.39                         | 1.63                          | 1.34                          | 0.67                      | 0.50                       | 0.43                       | 0.74     | 0.76     | 1.08     |
| 1 1/4 x 1/2 x 1 1/4   | 1.75            | 1.53            | 1.75            | 2.39                         | 1.34                          | 2.39                          | 0.67                      | 0.43                       | 0.67                       | 1.04     | 0.99     | 1.04     |
| 1 1/4 x 1/2 x 1       | 1.58            | 1.36            | 1.67            | 2.39                         | 1.34                          | 1.95                          | 0.67                      | 0.43                       | 0.58                       | 0.87     | 0.82     | 0.98     |
| *1 1/4 x 1/2 x 3/4    | 1.45            | 1.31            | 1.62            | 2.39                         | 1.34                          | 1.63                          | 0.67                      | 0.43                       | 0.50                       | 0.74     | 0.77     | 1.07     |
| *1 1/4 x 1/2 x 1/2    | 1.34            | 1.12            | 1.53            | 2.39                         | 1.34                          | 1.34                          | 0.67                      | 0.43                       | 0.43                       | 0.63     | 0.58     | 0.99     |
| *1 1/4 x 1/2 x 3/8    | 1.58            | 1.45            | 1.45            | 2.39                         | 1.34                          | 1.12                          | 0.67                      | 0.43                       | 0.36                       | 0.87     | 0.91     | 1.04     |
| *1 1/4 x 1/4 x 1 1/4  | 1.75            | 1.53            | 1.75            | 2.39                         | 0.93                          | 2.39                          | 0.67                      | 0.32                       | 0.67                       | 1.04     | 1.12     | 1.04     |
| *1 1/4 x 1/8 x 1 1/4  | 1.75            | 1.53            | 1.75            | 2.39                         | 0.81                          | 2.39                          | 0.67                      | 0.32                       | 0.67                       | 1.04     | 1.26     | 1.04     |
| 1 x 1 x 1 1/4         | 1.67            | 1.67            | 1.58            | 1.95                         | 1.95                          | 2.39                          | 0.58                      | 0.58                       | 0.67                       | 0.98     | 0.98     | 0.87     |
| *1 x 3/4 x 1 1/4      | 1.75            | 1.62            | 1.75            | 1.95                         | 1.63                          | 2.39                          | 0.58                      | 0.50                       | 0.67                       | 1.06     | 1.07     | 1.04     |
| *1 x 1/2 x 1 1/4      | 1.75            | 1.53            | 1.75            | 1.95                         | 1.34                          | 2.39                          | 0.58                      | 0.43                       | 0.67                       | 1.06     | 0.99     | 1.04     |
| 1 1/2 x 1 1/2 x 1 1/4 | 1.82            | 1.82            | 1.88            | 2.68                         | 2.68                          | 2.39                          | 0.70                      | 0.70                       | 0.67                       | 1.09     | 1.09     | 1.17     |
| 1 1/2 x 1 1/2 x 1     | 1.65            | 1.65            | 1.80            | 2.68                         | 2.68                          | 1.95                          | 0.70                      | 0.70                       | 0.58                       | 0.92     | 0.92     | 1.11     |
| 1 1/2 x 1 1/2 x 3/4   | 1.52            | 1.52            | 1.75            | 2.68                         | 2.68                          | 1.63                          | 0.70                      | 0.70                       | 0.50                       | 0.79     | 0.79     | 1.20     |
| 1 1/2 x 1 1/2 x 1/2   | 1.41            | 1.41            | 1.66            | 2.68                         | 2.68                          | 1.34                          | 0.70                      | 0.70                       | 0.43                       | 0.68     | 0.68     | 1.12     |
| 1 1/2 x 1 1/2 x 3/8   | 1.41            | 1.41            | 1.66            | 2.68                         | 2.68                          | 1.12                          | 0.70                      | 0.70                       | 0.36                       | 0.68     | 0.68     | 1.25     |
| 1 1/2 x 1 1/4 x 1 1/2 | 1.94            | 1.88            | 1.94            | 2.68                         | 2.39                          | 2.68                          | 0.70                      | 0.67                       | 0.70                       | 1.21     | 1.17     | 1.21     |
| 1 1/2 x 1 1/4 x 1 1/4 | 1.82            | 1.75            | 1.88            | 2.68                         | 2.39                          | 2.39                          | 0.70                      | 0.67                       | 0.67                       | 1.09     | 1.04     | 1.17     |
| 1 1/2 x 1 1/4 x 1     | 1.65            | 1.58            | 1.80            | 2.68                         | 2.39                          | 1.95                          | 0.70                      | 0.67                       | 0.58                       | 0.92     | 0.87     | 1.11     |
| 1 1/2 x 1 1/4 x 3/4   | 1.52            | 1.45            | 1.75            | 2.68                         | 2.39                          | 1.63                          | 0.70                      | 0.67                       | 0.50                       | 0.79     | 0.74     | 1.20     |
| 1 1/2 x 1 1/4 x 1/2   | 1.41            | 1.34            | 1.66            | 2.68                         | 2.39                          | 1.34                          | 0.70                      | 0.67                       | 0.43                       | 0.68     | 0.63     | 1.12     |
| 1 1/2 x 1 x 1 1/2     | 1.94            | 1.80            | 1.94            | 2.68                         | 1.95                          | 2.68                          | 0.70                      | 0.58                       | 0.70                       | 1.21     | 1.11     | 1.21     |
| 1 1/2 x 1 x 1 1/4     | 1.94            | 1.80            | 1.94            | 2.68                         | 1.95                          | 2.39                          | 0.70                      | 0.58                       | 0.67                       | 1.21     | 1.11     | 1.23     |
| 1 1/2 x 1 x 1         | 1.65            | 1.50            | 1.80            | 2.68                         | 1.95                          | 1.95                          | 0.70                      | 0.58                       | 0.58                       | 0.92     | 0.81     | 1.11     |
| *1 1/2 x 1 x 3/4      | 1.65            | 1.50            | 1.80            | 2.68                         | 1.95                          | 1.63                          | 0.70                      | 0.58                       | 0.50                       | 0.92     | 0.81     | 1.25     |
| *1 1/2 x 1 x 1/2      | 1.41            | 1.34            | 1.66            | 2.68                         | 1.95                          | 1.34                          | 0.70                      | 0.58                       | 0.43                       | 0.68     | 0.65     | 1.12     |
| 1 1/2 x 3/4 x 1 1/2   | 1.94            | 1.75            | 1.94            | 2.68                         | 1.63                          | 2.68                          | 0.70                      | 0.50                       | 0.70                       | 1.21     | 1.20     | 1.21     |
| 1 1/2 x 3/4 x 1 1/4   | 1.82            | 1.62            | 1.88            | 2.68                         | 1.63                          | 2.39                          | 0.70                      | 0.50                       | 1.09                       | 1.21     | 1.07     | 1.17     |
| *1 1/2 x 3/4 x 1      | 1.65            | 1.50            | 1.80            | 2.68                         | 1.63                          | 1.95                          | 0.70                      | 0.50                       | 0.58                       | 0.92     | 0.95     | 1.11     |
| *1 1/2 x 3/4 x 3/4    | 1.65            | 1.50            | 1.80            | 2.68                         | 1.63                          | 1.63                          | 0.70                      | 0.50                       | 0.50                       | 0.92     | 0.95     | 1.25     |
| *1 1/2 x 3/4 x 1/2    | 1.52            | 1.37            | 1.80            | 2.68                         | 1.63                          | 1.34                          | 0.70                      | 0.50                       | 0.43                       | 0.80     | 0.82     | 1.26     |
| 1 1/2 x 1/2 x 1 1/2   | 1.94            | 1.66            | 1.94            | 2.68                         | 1.34                          | 2.68                          | 0.70                      | 0.43                       | 0.70                       | 1.21     | 1.12     | 1.21     |
| *1 1/2 x 1/2 x 1 1/4  | 1.94            | 1.66            | 1.94            | 2.68                         | 1.34                          | 2.39                          | 0.70                      | 0.43                       | 0.67                       | 1.21     | 1.12     | 1.23     |
| *1 1/2 x 1/2 x 3/4    | 1.52            | 1.37            | 1.80            | 2.68                         | 1.34                          | 1.63                          | 0.70                      | 0.43                       | 0.50                       | 0.80     | 0.84     | 1.25     |
| *1 1/2 x 1/2 x 1/2    | 1.52            | 1.37            | 1.80            | 2.68                         | 1.34                          | 1.34                          | 0.70                      | 0.43                       | 0.43                       | 0.80     | 0.84     | 1.26     |
| 1 1/4 x 1 1/4 x 1 1/2 | 1.88            | 1.88            | 1.82            | 2.39                         | 2.39                          | 2.68                          | 0.67                      | 0.67                       | 0.70                       | 1.17     | 1.17     | 1.09     |
| 1 1/4 x 1 x 1 1/2     | 1.88            | 1.80            | 1.82            | 2.39                         | 1.95                          | 2.68                          | 0.67                      | 0.58                       | 0.70                       | 1.17     | 1.11     | 1.09     |
| *1 1/4 x 3/4 x 1 1/2  | 1.94            | 1.75            | 1.94            | 2.39                         | 1.63                          | 2.68                          | 0.67                      | 0.50                       | 0.70                       | 1.23     | 1.20     | 1.21     |
| *1 1/4 x 1/2 x 1 1/2  | 1.94            | 1.66            | 1.94            | 2.39                         | 1.34                          | 2.68                          | 0.67                      | 0.43                       | 0.70                       | 1.23     | 1.12     | 1.21     |

\* Manufactured to WARD specifications



# CAST IRON REDUCING TEE CLASS 125

| NPS                   | Center to End A | Center to End B | Center to End C | Outside Dia. of Band D (min) | Outside Dia. of Band D2 (Min) | Outside Dia. of Band D3 (min) | Length of Threads E (min) | Length of Threads E2 (min) | Length of Threads E3 (min) | Take Out | Take Out | Take Out |
|-----------------------|-----------------|-----------------|-----------------|------------------------------|-------------------------------|-------------------------------|---------------------------|----------------------------|----------------------------|----------|----------|----------|
| 1 x 1 x 1 1/2         | 1.80            | 1.80            | 1.65            | 1.95                         | 1.95                          | 2.68                          | 0.58                      | 0.58                       | 0.70                       | 1.11     | 1.11     | 0.92     |
| 2 x 2 x 1 1/2         | 2.02            | 2.02            | 2.16            | 3.28                         | 3.28                          | 2.68                          | 0.75                      | 0.75                       | 0.70                       | 1.26     | 1.26     | 1.43     |
| 2 x 2 x 1 1/4         | 1.90            | 1.90            | 2.10            | 3.28                         | 3.28                          | 2.39                          | 0.75                      | 0.75                       | 0.67                       | 1.14     | 1.14     | 1.39     |
| 2 x 2 x 1             | 1.73            | 1.73            | 2.02            | 3.28                         | 3.28                          | 1.95                          | 0.75                      | 0.75                       | 0.58                       | 0.97     | 0.97     | 1.33     |
| 2 x 2 x 3/4           | 1.60            | 1.60            | 1.97            | 3.28                         | 3.28                          | 1.63                          | 0.75                      | 0.75                       | 0.50                       | 0.84     | 0.84     | 1.42     |
| 2 x 2 x 1/2           | 1.49            | 1.49            | 1.88            | 3.28                         | 3.28                          | 1.34                          | 0.75                      | 0.75                       | 0.43                       | 0.73     | 0.73     | 1.34     |
| 2 x 1 1/2 x 2         | 2.25            | 2.16            | 2.25            | 3.28                         | 2.68                          | 3.28                          | 0.75                      | 0.70                       | 0.75                       | 1.49     | 1.43     | 1.49     |
| 2 x 1 1/2 x 1 1/2     | 2.02            | 1.94            | 2.16            | 3.28                         | 2.68                          | 2.68                          | 0.75                      | 0.70                       | 0.70                       | 1.26     | 1.21     | 1.43     |
| 2 x 1 1/2 x 1 1/4     | 2.02            | 1.94            | 2.16            | 3.28                         | 2.68                          | 2.39                          | 0.75                      | 0.70                       | 0.67                       | 1.26     | 1.21     | 1.45     |
| 2 x 1 1/2 x 1         | 1.73            | 1.65            | 2.02            | 3.28                         | 2.68                          | 1.95                          | 0.75                      | 0.70                       | 0.58                       | 0.97     | 0.92     | 1.33     |
| 2 x 1 1/2 x 3/4       | 1.60            | 1.52            | 1.97            | 3.28                         | 2.68                          | 1.63                          | 0.75                      | 0.70                       | 0.50                       | 0.84     | 0.79     | 1.42     |
| 2 x 1 1/2 x 1/2       | 1.49            | 1.41            | 1.88            | 3.28                         | 2.68                          | 1.34                          | 0.75                      | 0.70                       | 0.43                       | 0.73     | 0.68     | 1.34     |
| 2 x 1 1/4 x 2         | 2.25            | 2.10            | 2.25            | 3.28                         | 2.39                          | 3.28                          | 0.75                      | 0.67                       | 0.75                       | 1.49     | 1.39     | 1.49     |
| 2 x 1 1/4 x 1 1/2     | 1.02            | 1.88            | 2.16            | 3.28                         | 2.39                          | 2.68                          | 0.75                      | 0.67                       | 0.70                       | 0.26     | 1.17     | 1.43     |
| 2 x 1 1/4 x 1 1/4     | 1.90            | 1.75            | 2.10            | 3.28                         | 2.39                          | 2.39                          | 0.75                      | 0.67                       | 0.67                       | 1.14     | 1.04     | 1.39     |
| 2 x 1 1/4 x 1         | 1.73            | 1.58            | 2.02            | 3.28                         | 2.39                          | 1.95                          | 0.75                      | 0.67                       | 0.58                       | 0.97     | 0.87     | 1.33     |
| 2 x 1 1/4 x 3/4       | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| *2 x 1 1/4 x 1/2      | 1.49            | 1.41            | 1.88            | 3.28                         | 2.39                          | 1.34                          | 0.75                      | 0.67                       | 0.43                       | 0.73     | 0.70     | 1.34     |
| 2 x 1 x 2             | 2.25            | 2.02            | 2.25            | 3.28                         | 1.95                          | 3.28                          | 0.75                      | 0.58                       | 0.75                       | 1.49     | 1.33     | 1.49     |
| 2 x 1 x 1 1/2         | 2.02            | 1.80            | 2.16            | 3.28                         | 1.95                          | 2.68                          | 0.75                      | 0.58                       | 0.70                       | 1.26     | 1.11     | 1.43     |
| 2 x 1 x 1 1/4         | 1.90            | 1.67            | 2.10            | 3.28                         | 1.95                          | 2.39                          | 0.75                      | 0.58                       | 0.67                       | 1.14     | 0.98     | 1.39     |
| *2 x 1 x 1            | 1.73            | 1.94            | 2.02            | 3.28                         | 1.95                          | 1.95                          | 0.75                      | 0.58                       | 0.58                       | 0.97     | 1.25     | 1.33     |
| *2 x 1 x 3/4          | 1.73            | 1.94            | 2.02            | 3.28                         | 1.95                          | 1.63                          | 0.75                      | 0.58                       | 0.50                       | 0.97     | 1.25     | 1.47     |
| 2 x 3/4 x 2           | 2.25            | 1.97            | 2.25            | 3.28                         | 1.63                          | 3.28                          | 0.75                      | 0.50                       | 0.75                       | 1.49     | 1.42     | 1.49     |
| *2 x 3/4 x 1 1/2      | 2.25            | 1.97            | 2.25            | 3.28                         | 1.63                          | 2.68                          | 0.75                      | 0.50                       | 0.70                       | 1.49     | 1.42     | 1.52     |
| *2 x 3/4 x 1 1/4      | 2.25            | 1.97            | 2.25            | 3.28                         | 1.63                          | 2.39                          | 0.75                      | 0.50                       | 0.67                       | 1.49     | 1.42     | 1.54     |
| *2 x 3/4 x 1          | 1.73            | 1.94            | 2.02            | 3.28                         | 1.63                          | 1.95                          | 0.75                      | 0.50                       | 0.58                       | 0.97     | 1.39     | 1.33     |
| *2 x 3/4 x 3/4        | 1.60            | 1.60            | 1.97            | 3.28                         | 1.63                          | 1.63                          | 0.75                      | 0.50                       | 0.50                       | 0.84     | 1.05     | 1.42     |
| *2 x 3/4 x 1/2        | 1.60            | 1.60            | 1.97            | 3.28                         | 1.63                          | 1.34                          | 0.75                      | 0.50                       | 0.43                       | 0.84     | 1.05     | 1.43     |
| 2 x 1/2 x 2           | 2.25            | 1.88            | 2.25            | 3.28                         | 1.34                          | 3.280                         | 0.75                      | 0.43                       | 0.75                       | 1.49     | 1.34     | 1.49     |
| *2 x 1/2 x 1 1/2      | 2.02            | 1.66            | 2.16            | 3.28                         | 1.34                          | 2.68                          | 0.75                      | 0.43                       | 0.70                       | 1.26     | 1.12     | 1.43     |
| *2 x 1/2 x 1 1/4      | 2.02            | 1.66            | 2.16            | 3.28                         | 1.34                          | 2.39                          | 0.75                      | 0.43                       | 0.67                       | 1.26     | 1.12     | 1.45     |
| *2 x 1/2 x 3/4        | 1.60            | 1.60            | 1.97            | 3.28                         | 1.34                          | 1.63                          | 0.75                      | 0.43                       | 0.50                       | 0.84     | 1.06     | 1.42     |
| *2 x 1/2 x 1/2        | 1.60            | 1.60            | 1.97            | 3.28                         | 1.34                          | 1.34                          | 0.75                      | 0.43                       | 0.43                       | 0.84     | 1.06     | 1.43     |
| 1 1/2 x 1 1/2 x 2     | 2.16            | 2.16            | 2.02            | 2.68                         | 2.68                          | 3.28                          | 0.70                      | 0.70                       | 0.75                       | 1.43     | 1.43     | 1.26     |
| 1 1/2 x 1 1/4 x 2     | 2.16            | 2.10            | 2.02            | 2.68                         | 2.39                          | 3.28                          | 0.70                      | 0.67                       | 0.75                       | 1.43     | 1.39     | 1.26     |
| 1 1/2 x 1 x 2         | 2.16            | 2.02            | 2.02            | 2.68                         | 1.95                          | 3.28                          | 0.70                      | 0.58                       | 0.75                       | 1.43     | 1.33     | 1.26     |
| 1 1/4 x 1 1/4 x 2     | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 1 1/4 x 1 x 2         | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 1 x 1 x 2             | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 2 1/2 x 2 1/2 x 2     | 2.39            | 2.39            | 2.60            | 3.86                         | 3.86                          | 3.28                          | 0.92                      | 0.92                       | 0.75                       | 1.25     | 1.25     | 1.84     |
| 2 1/2 x 2 1/2 x 1 1/2 | 2.16            | 2.16            | 2.51            | 3.86                         | 3.86                          | 2.68                          | 0.92                      | 0.92                       | 0.70                       | 1.02     | 1.02     | 1.78     |

\* Manufactured to WARD specifications

# CAST IRON REDUCING TEE CLASS 125

| NPS                    | Center to End A | Center to End B | Center to End C | Outside Dia. of Band D (min) | Outside Dia. of Band D2 (Min) | Outside Dia. of Band D3 (min) | Length of Threads E (min) | Length of Threads E2 (min)) | Length of Threads E3 (min) | Take Out | Take Out | Take Out |
|------------------------|-----------------|-----------------|-----------------|------------------------------|-------------------------------|-------------------------------|---------------------------|-----------------------------|----------------------------|----------|----------|----------|
| 2 1/2 x 2 1/2 x 1 1/4  | 2.04            | 2.04            | 2.45            | 3.86                         | 3.86                          | 2.39                          | 0.92                      | 0.92                        | 0.67                       | 0.90     | 0.90     | 1.74     |
| 2 1/2 x 2 1/2 x 1      | 1.87            | 1.87            | 2.37            | 3.86                         | 3.86                          | 1.95                          | 0.92                      | 0.92                        | 0.58                       | 0.73     | 0.73     | 1.68     |
| 2 1/2 x 2 1/2 x 3/4    | 1.87            | 1.87            | 2.32            | 3.86                         | 3.86                          | 1.63                          | 0.92                      | 0.92                        | 0.50                       | 0.73     | 0.73     | 1.77     |
| 2 1/2 x 2 1/2 x 1/2    | 1.87            | 1.87            | 2.23            | 3.86                         | 3.86                          | 1.34                          | 0.92                      | 0.92                        | 0.43                       | 0.73     | 0.73     | 1.69     |
| 2 1/2 x 2 x 2 1/2      | 2.70            | 2.60            | 2.70            | 3.86                         | 3.28                          | 3.86                          | 0.92                      | 0.75                        | 0.92                       | 1.56     | 1.84     | 1.56     |
| 2 1/2 x 2 x 2          | 2.39            | 2.25            | 2.60            | 3.86                         | 3.28                          | 3.28                          | 0.92                      | 0.75                        | 0.75                       | 1.25     | 1.49     | 1.84     |
| 2 1/2 x 2 x 1 1/2      | 2.16            | 2.02            | 2.51            | 3.86                         | 3.28                          | 2.68                          | 0.92                      | 0.75                        | 0.70                       | 1.02     | 1.26     | 1.78     |
| 2 1/2 x 2 x 1 1/4      | 2.04            | 1.90            | 2.45            | 3.86                         | 3.28                          | 2.39                          | 0.92                      | 0.75                        | 0.67                       | 0.90     | 1.14     | 1.74     |
| 2 1/2 x 2 x 1          | 1.87            | 1.73            | 2.37            | 3.86                         | 3.28                          | 1.95                          | 0.92                      | 0.75                        | 0.58                       | 0.73     | 0.97     | 1.68     |
| 2 1/2 x 2 x 3/4        | 1.74            | 1.60            | 2.32            | 3.86                         | 3.28                          | 1.63                          | 0.92                      | 0.75                        | 0.50                       | 0.60     | 0.84     | 1.77     |
| 2 1/2 x 2 x 1/2        | 1.63            | 1.49            | 2.23            | 3.86                         | 3.28                          | 1.34                          | 0.92                      | 0.75                        | 0.43                       | 0.49     | 0.73     | 1.696    |
| 2 1/2 x 1 1/2 x 2 1/2  | 2.70            | 2.51            | 2.70            | 3.86                         | 2.68                          | 3.86                          | 0.92                      | 0.70                        | 0.92                       | 1.56     | 1.78     | 1.563    |
| 2 1/2 x 1 1/2 x 2      | 2.39            | 2.16            | 2.60            | 3.86                         | 2.68                          | 3.28                          | 0.92                      | 0.70                        | 0.75                       | 1.25     | 1.43     | 1.84     |
| 2 1/2 x 1 1/2 x 1 1/2  | 2.16            | 1.94            | 2.51            | 3.86                         | 2.68                          | 2.68                          | 0.92                      | 0.70                        | 0.70                       | 1.02     | 1.21     | 1.786    |
| *2 1/2 x 1 1/2 x 1 1/4 | 2.04            | 1.90            | 2.45            | 3.86                         | 2.68                          | 2.39                          | 0.92                      | 0.70                        | 0.67                       | 0.90     | 1.17     | 1.743    |
| *2 1/2 x 1 1/2 x 1/2   | 1.63            | 1.49            | 2.23            | 3.86                         | 2.68                          | 1.34                          | 0.92                      | 0.70                        | 0.43                       | 0.49     | 0.76     | 1.696    |
| 2 1/2 x 1 1/4 x 2 1/2  | 2.70            | 2.45            | 2.70            | 3.86                         | 2.39                          | 3.86                          | 0.92                      | 0.67                        | 0.92                       | 1.56     | 1.74     | 1.563    |
| 2 1/2 x 1 1/4 x 2      | 2.70            | 2.45            | 2.70            | 3.86                         | 2.39                          | 3.28                          | 0.92                      | 0.67                        | 0.75                       | 1.56     | 1.74     | 1.94     |
| *2 1/2 x 1 1/4 x 1 1/2 | 2.16            | 1.94            | 2.51            | 3.86                         | 2.39                          | 2.68                          | 0.92                      | 0.67                        | 0.70                       | 1.02     | 1.23     | 1.78     |
| *2 1/2 x 1 1/4 x 1 1/4 | 2.04            | 1.90            | 2.45            | 3.86                         | 2.39                          | 2.39                          | 0.92                      | 0.67                        | 0.67                       | 0.90     | 1.19     | 1.74     |
| *2 1/2 x 1 1/4 x 1     | 2.14            | 2.12            | 2.51            | 3.86                         | 2.39                          | 1.95                          | 0.92                      | 0.67                        | 0.58                       | 1.00     | 1.41     | 1.82     |
| 2 1/2 x 1 x 2 1/2      | 2.70            | 2.37            | 2.70            | 3.86                         | 1.95                          | 3.86                          | 0.92                      | 0.58                        | 0.92                       | 1.56     | 1.68     | 1.56     |
| 2 1/2 x 1 x 2          | 2.39            | 2.02            | 2.60            | 3.86                         | 1.95                          | 3.28                          | 0.92                      | 0.58                        | 0.75                       | 1.25     | 1.33     | 1.84     |
| *2 1/2 x 1 x 1 1/4     | 2.14            | 2.12            | 2.51            | 3.86                         | 1.95                          | 2.39                          | 0.92                      | 0.58                        | 0.67                       | 1.00     | 1.43     | 1.80     |
| *2 1/2 x 1 x 1         | 1.94            | 1.75            | 2.37            | 3.86                         | 1.95                          | 1.95                          | 0.92                      | 0.58                        | 0.58                       | 0.80     | 1.06     | 1.68     |
| *2 1/2 x 1 x 3/4       | 1.94            | 1.75            | 2.37            | 3.86                         | 1.95                          | 1.63                          | 0.92                      | 0.58                        | 0.50                       | 0.80     | 1.06     | 1.82     |
| 2 1/2 x 3/4 x 2 1/2    | 2.70            | 2.32            | 2.70            | 3.86                         | 1.63                          | 3.86                          | 0.92                      | 0.50                        | 0.92                       | 1.56     | 1.77     | 1.56     |
| *2 1/2 x 3/4 x 2       | 2.70            | 2.32            | 2.70            | 3.86                         | 1.63                          | 3.28                          | 0.92                      | 0.50                        | 0.75                       | 1.56     | 1.77     | 1.94     |
| *2 1/2 x 3/4 x 3/4     | 1.94            | 1.75            | 2.37            | 3.86                         | 1.63                          | 1.63                          | 0.92                      | 0.50                        | 0.50                       | 0.80     | 1.20     | 1.82     |
| 2 1/2 x 1/2 x 2 1/2    | 2.70            | 2.23            | 2.70            | 3.86                         | 1.34                          | 3.86                          | 0.92                      | 0.43                        | 0.92                       | 1.56     | 1.69     | 1.56     |
| *2 1/2 x 1/2 X 2       | 2.70            | 2.60            | 2.70            | 3.86                         | 1.34                          | 3.28                          | 0.92                      | 0.43                        | 0.75                       | 1.56     | 2.06     | 1.94     |
| 2 x 2 x 2 1/2          | 2.60            | 2.60            | 2.39            | 3.28                         | 3.28                          | 3.86                          | 0.75                      | 0.75                        | 0.92                       | 1.84     | 1.46     | 1.25     |
| 2 x 1 1/2 x 2 1/2      | 2.60            | 2.51            | 2.39            | 3.28                         | 2.68                          | 3.86                          | 0.75                      | 0.70                        | 0.92                       | 1.84     | 1.78     | 1.25     |
| 2 x 1 1/4 x 2 1/2      | 2.60            | 2.45            | 2.39            | 3.28                         | 2.39                          | 3.86                          | 0.75                      | 0.67                        | 0.92                       | 1.84     | 1.74     | 1.25     |
| *2 x 1 x 2 1/2         | 2.70            | 2.45            | 2.70            | 3.28                         | 1.95                          | 3.86                          | 0.75                      | 0.58                        | 0.92                       | 1.94     | 1.76     | 1.56     |
| *2 x 3/4 x 2 1/2       | 2.70            | 2.32            | 2.70            | 3.28                         | 1.63                          | 3.86                          | 0.75                      | 0.50                        | 0.92                       | 1.94     | 1.77     | 1.56     |
| 1 1/2 x 1 1/2 x 2 1/2  | 2.51            | 2.51            | 2.16            | 2.68                         | 2.68                          | 3.86                          | 0.70                      | 0.70                        | 0.92                       | 1.78     | 1.78     | 1.02     |
| 3 x 3 x 2 1/2          | 2.83            | 2.83            | 2.99            | 4.62                         | 4.62                          | 3.86                          | 0.98                      | 0.98                        | 0.92                       | 1.63     | 1.63     | 1.85     |
| 3 x 3 x 2              | 2.52            | 2.52            | 2.89            | 4.62                         | 4.62                          | 3.28                          | 0.98                      | 0.98                        | 0.75                       | 1.32     | 1.32     | 2.13     |
| 3 x 3 x 1 1/2          | 2.29            | 2.29            | 2.80            | 4.62                         | 4.62                          | 2.68                          | 0.98                      | 0.98                        | 0.70                       | 1.09     | 1.09     | 2.07     |
| 3 x 3 x 1 1/4          | 2.17            | 2.17            | 2.74            | 4.62                         | 4.62                          | 2.39                          | 0.98                      | 0.98                        | 0.67                       | 0.97     | 0.97     | 2.03     |
| 3 x 3 x 1              | 2.00            | 2.00            | 2.66            | 4.62                         | 4.62                          | 1.95                          | 0.98                      | 0.98                        | 0.58                       | 0.80     | 0.80     | 1.97     |

\* Manufactured to WARD specifications

# CAST IRON REDUCING TEE CLASS 125

| NPS                   | Center to End A | Center to End B | Center to End C | Outside Dia. of Band D (min) | Outside Dia. of Band D2 (Min) | Outside Dia. of Band D3 (min) | Length of Threads E (min) | Length of Threads E2 (min) | Length of Threads E3 (min) | Take Out | Take Out | Take Out |
|-----------------------|-----------------|-----------------|-----------------|------------------------------|-------------------------------|-------------------------------|---------------------------|----------------------------|----------------------------|----------|----------|----------|
| 3 x 3 x 3/4           | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 3 x 3 x 1/2           | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 3 x 2 1/2 x 3         | 3.08            | 2.99            | 3.08            | 4.62                         | 3.86                          | 4.62                          | 0.98                      | 0.92                       | 0.98                       | 1.88     | 1.85     | 1.88     |
| 3 x 2 1/2 x 2 1/2     | 2.83            | 2.70            | 2.99            | 4.62                         | 3.86                          | 3.86                          | 0.98                      | 0.92                       | 0.92                       | 1.63     | 1.56     | 1.85     |
| 3 x 2 1/2 x 2         | 2.52            | 2.39            | 2.89            | 4.62                         | 3.86                          | 3.28                          | 0.98                      | 0.92                       | 0.75                       | 1.32     | 1.25     | 2.13     |
| 3 x 2 1/2 x 1 1/2     | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 3 x 2 1/2 x 1 1/4     | 2.17            | 2.04            | 2.74            | 4.62                         | 3.86                          | 2.39                          | 0.98                      | 0.92                       | 0.67                       | 0.97     | 0.90     | 2.03     |
| 3 x 2 1/2 x 1         | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 3 x 2 x 3             | 3.08            | 2.89            | 3.08            | 4.62                         | 3.28                          | 4.62                          | 0.98                      | 0.75                       | 0.98                       | 1.88     | 2.13     | 1.88     |
| 3 x 2 x 2 1/2         | 2.83            | 2.60            | 2.99            | 4.62                         | 3.28                          | 3.86                          | 0.98                      | 0.75                       | 0.92                       | 1.63     | 1.84     | 1.85     |
| 3 x 2 x 2             | 2.52            | 2.25            | 2.89            | 4.62                         | 3.28                          | 3.28                          | 0.98                      | 0.75                       | 0.75                       | 1.32     | 1.49     | 2.13     |
| 3 x 2 x 1 1/2         | 2.29            | 2.02            | 2.80            | 4.62                         | 3.28                          | 2.68                          | 0.98                      | 0.75                       | 0.70                       | 1.09     | 1.26     | 2.07     |
| 3 x 1 1/2 x 3         | 3.08            | 2.80            | 3.08            | 4.62                         | 2.68                          | 4.62                          | 0.98                      | 0.70                       | 0.98                       | 1.88     | 2.07     | 1.88     |
| *3 x 1 1/2 x 2        | 2.52            | 2.25            | 2.89            | 4.62                         | 2.68                          | 3.28                          | 0.98                      | 0.70                       | 0.75                       | 1.32     | 1.52     | 2.13     |
| *3 x 1 1/2 x 1 1/2    | 2.52            | 2.25            | 2.89            | 4.62                         | 2.68                          | 2.68                          | 0.98                      | 0.70                       | 0.70                       | 1.32     | 1.52     | 2.16     |
| 3 x 1 1/4 x 3         | 3.08            | 2.74            | 3.08            | 4.62                         | 2.39                          | 4.62                          | 0.98                      | 0.67                       | 0.98                       | 1.88     | 2.03     | 1.88     |
| *3 x 1 1/4 x 2        | 2.52            | 2.70            | 2.89            | 4.62                         | 2.39                          | 3.28                          | 0.98                      | 0.67                       | 0.75                       | 1.32     | 1.99     | 2.13     |
| 3 x 1 x 3             | 3.08            | 2.66            | 3.08            | 4.62                         | 1.95                          | 4.62                          | 0.98                      | 0.58                       | 0.98                       | 1.88     | 1.97     | 1.88     |
| *3 x 1 x 2            | 2.52            | 2.63            | 2.89            | 4.62                         | 1.95                          | 3.28                          | 0.98                      | 0.58                       | 0.75                       | 1.32     | 1.94     | 2.13     |
| 3 x 3/4 x 3           | 3.08            | 2.61            | 3.08            | 4.62                         | 1.63                          | 4.62                          | 0.98                      | 0.50                       | 0.98                       | 1.88     | 2.06     | 1.88     |
| 2 1/2 x 2 1/2 x 3     | 2.99            | 2.99            | 2.83            | 3.86                         | 3.86                          | 4.62                          | 0.92                      | 0.92                       | 0.98                       | 1.85     | 1.85     | 1.63     |
| 2 1/2 x 2 x 3         | 2.99            | 2.89            | 2.83            | 3.86                         | 3.28                          | 4.62                          | 0.92                      | 0.75                       | 0.98                       | 1.85     | 2.13     | 1.63     |
| 2 x 2 x 3             | 2.89            | 2.99            | 2.52            | 3.28                         | 3.28                          | 4.62                          | 0.75                      | 0.75                       | 0.98                       | 2.13     | 2.23     | 1.32     |
| *1 1/2 x 1 1/2 x 3    | 2.83            | 2.83            | 2.27            | 2.68                         | 2.68                          | 4.62                          | 0.70                      | 0.70                       | 0.98                       | 2.10     | 2.10     | 1.07     |
| 3 1/2 x 3 1/2 x 3     | 3.18            | 3.18            | 3.33            | 5.20                         | 5.20                          | 4.62                          | 1.03                      | 1.03                       | 0.98                       | 1.93     | 1.93     | 2.13     |
| 3 1/2 x 3 1/2 x 2 1/2 | 2.93            | 2.93            | 3.24            | 5.20                         | 5.20                          | 3.86                          | 1.03                      | 1.03                       | 0.92                       | 1.68     | 1.68     | 2.10     |
| 3 1/2 x 3 1/2 x 2     | 2.62            | 2.62            | 3.14            | 5.20                         | 5.20                          | 3.28                          | 1.03                      | 1.03                       | 0.75                       | 1.37     | 1.37     | 2.38     |
| 3 1/2 x 3 1/2 x 1 1/2 | 2.39            | 2.39            | 3.05            | 5.20                         | 5.20                          | 2.68                          | 1.03                      | 1.03                       | 0.70                       | 1.14     | 1.14     | 2.32     |
| 3 1/2 x 3 1/2 x 1 1/4 | 2.27            | 2.27            | 2.99            | 5.20                         | 5.20                          | 2.39                          | 1.03                      | 1.03                       | 0.67                       | 1.02     | 1.02     | 2.28     |
| 3 1/2 x 3 1/2 x 1     | 2.10            | 2.10            | 2.91            | 5.20                         | 5.20                          | 1.95                          | 1.03                      | 1.03                       | 0.58                       | 0.85     | 0.85     | 2.22     |
| *3 1/2 x 3 x 3 1/2    | 3.42            | 3.42            | 3.42            | 5.20                         | 4.62                          | 5.20                          | 1.03                      | 0.98                       | 1.03                       | 2.17     | 2.22     | 2.17     |
| 3 1/2 x 3 x 3         | 3.18            | 3.08            | 3.33            | 5.20                         | 4.62                          | 4.62                          | 1.03                      | 0.98                       | 0.98                       | 1.93     | 1.88     | 2.13     |
| 3 1/2 x 3 x 2 1/2     | 2.93            | 2.83            | 3.24            | 5.20                         | 4.62                          | 3.86                          | 1.03                      | 0.98                       | 0.92                       | 1.68     | 1.63     | 2.10     |
| 3 1/2 x 3 x 2         | 2.62            | 2.52            | 3.14            | 5.20                         | 4.62                          | 3.28                          | 1.03                      | 0.98                       | 0.75                       | 1.37     | 1.32     | 2.38     |
| 3 1/2 x 3 x 1 1/2     | 2.39            | 2.29            | 3.05            | 5.20                         | 4.62                          | 2.68                          | 1.03                      | 0.98                       | 0.70                       | 1.14     | 1.09     | 2.32     |
| *3 1/2 x 3 x 1 1/4    | 2.39            | 2.29            | 3.05            | 5.20                         | 4.62                          | 2.39                          | 1.03                      | 0.98                       | 0.67                       | 1.14     | 1.09     | 2.34     |
| *3 1/2 x 2 1/2 x 2    | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 3 1/2 x 1 1/4 x 3 1/2 | 3.42            | 2.99            | 3.42            | 5.20                         | 2.39                          | 5.20                          | 1.03                      | 0.67                       | 1.03                       | 2.17     | 2.28     | 2.17     |
| 3 1/2 x 1 x 3 1/2     | 3.42            | 2.91            | 3.42            | 5.20                         | 1.95                          | 5.20                          | 1.03                      | 0.58                       | 1.03                       | 2.17     | 2.22     | 2.17     |
| 3 x 3 x 3 1/2         | 3.33            | 3.33            | 3.18            | 4.62                         | 4.62                          | 5.20                          | 0.98                      | 0.98                       | 1.03                       | 2.13     | 2.13     | 1.93     |
| 4 x 4 x 3 1/2         | 3.54            | 3.54            | 3.69            | 5.79                         | 5.79                          | 5.20                          | 1.08                      | 1.08                       | 1.03                       | 2.24     | 2.24     | 2.44     |
| 4 x 4 x 3             | 3.30            | 3.30            | 3.60            | 5.79                         | 5.79                          | 4.62                          | 1.08                      | 1.08                       | 0.98                       | 2.00     | 2.00     | 2.40     |

\* Manufactured to WARD specifications

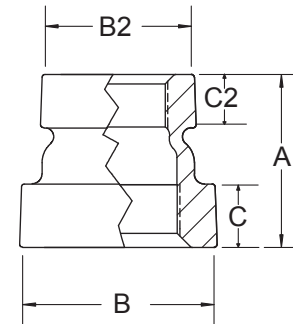
## CAST IRON REDUCING TEE CLASS 125

| NPS                | Center to End A | Center to End B | Center to End C | Outside Dia. of Band D (min) | Outside Dia. of Band D2 (Min) | Outside Dia. of Band D3 (min) | Length of Threads E (min) | Length of Threads E2 (min) | Length of Threads E3 (min) | Take Out | Take Out | Take Out |
|--------------------|-----------------|-----------------|-----------------|------------------------------|-------------------------------|-------------------------------|---------------------------|----------------------------|----------------------------|----------|----------|----------|
| 4 x 4 x 2 1/2      | 3.05            | 3.05            | 3.51            | 5.79                         | 5.79                          | 3.86                          | 1.08                      | 1.08                       | 0.92                       | 1.75     | 1.75     | 2.37     |
| 4 x 4 x 2          | 2.74            | 2.74            | 3.41            | 5.79                         | 5.79                          | 3.28                          | 1.08                      | 1.08                       | 0.75                       | 1.44     | 1.44     | 2.65     |
| 4 x 4 x 1 1/2      | 2.51            | 2.51            | 3.32            | 5.79                         | 5.79                          | 2.68                          | 1.08                      | 1.08                       | 0.70                       | 1.21     | 1.21     | 2.59     |
| 4 x 4 x 1 1/4      | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 4 x 4 x 1          | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 4 x 4 x 3/4        | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 4 x 3 1/2 x 4      | 3.79            | 3.69            | 3.79            | 5.79                         | 5.20                          | 5.79                          | 1.08                      | 1.03                       | 1.08                       | 2.49     | 2.44     | 2.49     |
| 4 x 3 1/2 x 3 1/2  | 3.54            | 3.42            | 3.69            | 5.79                         | 5.20                          | 5.20                          | 1.08                      | 1.03                       | 1.03                       | 2.24     | 2.17     | 2.44     |
| 4 x 3 1/2 x 3      | 3.30            | 3.18            | 3.60            | 5.79                         | 5.20                          | 4.62                          | 1.08                      | 1.03                       | 0.98                       | 2.00     | 1.93     | 2.40     |
| 4 x 3 1/2 x 2 1/2  | 3.05            | 2.93            | 3.51            | 5.79                         | 5.20                          | 3.86                          | 1.08                      | 1.03                       | 0.92                       | 1.75     | 1.68     | 2.37     |
| 4 x 3 1/2 x 2      | 2.74            | 2.62            | 3.41            | 5.79                         | 5.20                          | 3.28                          | 1.08                      | 1.03                       | 0.75                       | 1.44     | 1.37     | 2.65     |
| 4 x 3 1/2 x 1 1/2  | 2.51            | 2.39            | 3.32            | 5.79                         | 5.20                          | 2.68                          | 1.08                      | 1.03                       | 0.70                       | 1.21     | 1.14     | 2.59     |
| 4 x 3 x 4          | 3.79            | 3.60            | 3.79            | 5.79                         | 4.62                          | 5.79                          | 1.08                      | 0.98                       | 1.08                       | 2.49     | 2.40     | 2.49     |
| *4 x 3 x 3 1/2     | 3.79            | 3.69            | 3.79            | 5.79                         | 4.62                          | 5.20                          | 1.08                      | 0.98                       | 1.03                       | 2.49     | 2.49     | 2.54     |
| 4 x 3 x 3          | 3.30            | 3.08            | 3.60            | 5.79                         | 4.62                          | 4.62                          | 1.08                      | 0.98                       | 0.98                       | 2.00     | 1.88     | 2.40     |
| 4 x 3 x 2 1/2      | 3.05            | 2.83            | 3.51            | 5.79                         | 4.62                          | 3.86                          | 1.08                      | 0.98                       | 0.92                       | 1.75     | 1.63     | 2.37     |
| 4 x 3 x 2          | 2.74            | 2.52            | 3.41            | 5.79                         | 4.62                          | 3.28                          | 1.08                      | 0.98                       | 0.75                       | 1.44     | 1.32     | 2.65     |
| *4 x 3 x 1 1/2     | 2.51            | 2.39            | 3.32            | 5.79                         | 4.62                          | 2.68                          | 1.08                      | 0.98                       | 0.70                       | 1.21     | 1.19     | 2.59     |
| 4 x 2 1/2 x 4      | 3.79            | 3.51            | 3.79            | 5.79                         | 3.86                          | 5.79                          | 1.08                      | 0.92                       | 1.08                       | 2.49     | 2.37     | 2.49     |
| 4 x 2 1/2 x 3      | 3.30            | 2.99            | 3.60            | 5.79                         | 3.86                          | 4.62                          | 1.08                      | 0.92                       | 0.98                       | 2.00     | 1.85     | 2.40     |
| 4 x 2 1/2 x 2 1/2  | 3.05            | 2.70            | 3.51            | 5.79                         | 3.86                          | 3.86                          | 1.08                      | 0.92                       | 0.92                       | 1.75     | 1.56     | 2.37     |
| *4 x 2 1/2 x 2     | 3.05            | 2.70            | 3.51            | 5.79                         | 3.86                          | 3.28                          | 1.08                      | 0.92                       | 0.75                       | 1.75     | 1.56     | 2.75     |
| 4 x 2 x 4          | 3.79            | 3.41            | 3.79            | 5.79                         | 3.28                          | 5.79                          | 1.08                      | 0.75                       | 1.08                       | 2.49     | 2.65     | 2.49     |
| *4 x 2 x 2 1/2     | 3.05            | 2.70            | 3.51            | 5.79                         | 3.28                          | 3.86                          | 1.08                      | 0.75                       | 0.92                       | 1.75     | 1.94     | 2.37     |
| 4 x 2 x 2          | 2.74            | 2.25            | 3.41            | 5.79                         | 3.28                          | 3.28                          | 1.08                      | 0.75                       | 0.75                       | 1.44     | 1.49     | 2.65     |
| *4 x 2 x 1 1/2     | 2.74            | 2.25            | 3.41            | 5.79                         | 3.28                          | 2.68                          | 1.08                      | 0.75                       | 0.70                       | 1.44     | 1.49     | 2.68     |
| 4 x 1 1/2 x 4      | 3.79            | 3.32            | 3.79            | 5.79                         | 2.68                          | 5.79                          | 1.08                      | 0.70                       | 1.08                       | 2.49     | 2.59     | 2.49     |
| *4 x 1 1/2 x 2     | 2.74            | 2.25            | 3.41            | 5.79                         | 2.68                          | 3.28                          | 1.08                      | 0.70                       | 0.75                       | 1.44     | 1.52     | 2.65     |
| *4 x 1 1/2 x 1 1/2 | 2.74            | 2.25            | 3.41            | 5.79                         | 2.68                          | 2.68                          | 1.08                      | 0.70                       | 0.70                       | 1.44     | 1.52     | 2.68     |
| 4 x 1 1/4 x 4      | 3.79            | 3.26            | 3.79            | 5.79                         | 2.39                          | 5.79                          | 1.08                      | 0.67                       | 1.08                       | 2.49     | 2.55     | 2.49     |
| 4 x 1 x 4          | 3.79            | 3.18            | 3.79            | 5.79                         | 1.95                          | 5.79                          | 1.08                      | 0.58                       | 1.08                       | 2.49     | 2.49     | 2.49     |
| 3 1/2 x 3 1/2 x 4  | 3.69            | 3.69            | 3.54            | 5.20                         | 5.20                          | 5.79                          | 1.03                      | 1.03                       | 1.08                       | 2.44     | 2.44     | 2.24     |
| 3 x 3 x 4          | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 5 x 5 x 4          | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 5 x 5 x 3          | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 5 x 5 x 2 1/2      | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 5 x 5 x 2          | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 6 x 6 x 5          | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 6 x 6 x 4          | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |
| 6 x 6 x 3          | —               | —               | —               | —                            | —                             | —                             | —                         | —                          | —                          | —        | —        | —        |

\* Manufactured to WARD specifications

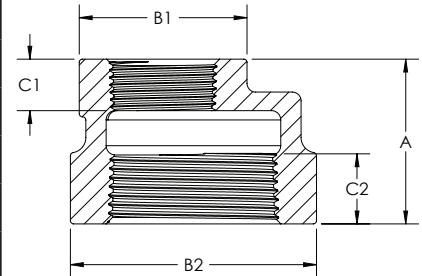
# CAST IRON CONCENTRIC REDUCING COUPLING CLASS 125

| NPS           | Length of Coupling A | Outside Dia. of Band Small End B (min) | Outside Dia. of Large End B2 (min) | Length of Threads Small End C (min) | Length of Threads Large End C2 (min) | Take Out | Take Out |
|---------------|----------------------|----------------------------------------|------------------------------------|-------------------------------------|--------------------------------------|----------|----------|
| 3/4 x 1/2     | 1.50                 | 1.31                                   | 1.62                               | 0.43                                | 0.50                                 | 0.20     | 0.22     |
| 1 x 1/2       | 1.70                 | 1.31                                   | 1.99                               | 0.43                                | 0.58                                 | 0.85     | 0.85     |
| 1 x 3/4       | 1.70                 | 1.63                                   | 1.99                               | 0.50                                | 0.58                                 | 0.85     | 0.85     |
| 1 1/4 x 1     | 2.130                | 1.95                                   | 2.39                               | 0.58                                | 0.67                                 | 0.17     | 0.30     |
| 1 1/4 x 3/4   | 2.13                 | 1.95                                   | 2.39                               | 0.50                                | 0.67                                 | 0.17     | 0.32     |
| 1 1/4 x 1/2   | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 1 1/2 x 1 1/4 | 2.25                 | 2.39                                   | 2.68                               | 0.67                                | 0.70                                 | 0.36     | 0.52     |
| 1 1/2 x 1     | 2.25                 | 2.39                                   | 2.68                               | 0.58                                | 0.70                                 |          |          |
| 1 1/2 x 3/4   | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 1 1/2 x 1/2   | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 2 x 1 1/2     | 2.32                 | 2.68                                   | 3.28                               | 0.70                                | 0.75                                 | 0.40     | 0.44     |
| 2 x 1 1/4     | 2.32                 | 2.39                                   | 3.28                               | 0.67                                | 0.75                                 | 0.40     | 0.45     |
| 2 x 1         | 2.32                 | 1.95                                   | 3.28                               | 0.58                                | 0.75                                 | 0.40     | 0.44     |
| 2 x 3/4       | 2.32                 | 1.63                                   | 3.28                               | 0.50                                | 0.75                                 | 0.40     | 0.45     |
| 2 x 1/2       | 2.32                 | 1.63                                   | 3.28                               | 0.43                                | 0.75                                 | 0.40     | 0.48     |
| 2 1/2 x 2     | 2.63                 | 3.28                                   | 3.86                               | 0.75                                | 0.92                                 | 0.18     | 0.56     |
| 2 1/2 x 1 1/2 | 2.63                 | 3.28                                   | 3.86                               | 0.70                                | 0.92                                 | 0.18     | 0.59     |
| 3 x 2 1/2     | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 3 x 2         | 2.88                 | 3.28                                   | 4.62                               | 0.75                                | 0.98                                 | 0.29     | 0.68     |
| 3 x 1 1/2     | 2.88                 | 3.28                                   | 4.62                               | 0.70                                | 0.98                                 | 0.24     | 0.72     |
| 4 x 3         | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 4 x 2 1/2     | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 4 x 2         | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |
| 6 x 4         | —                    | —                                      | —                                  | —                                   | —                                    | —        | —        |



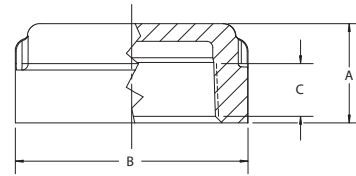
# CAST IRON ECCENTRIC REDUCING COUPLING CLASS 125

| NPS           | Length of Coupling A | Outside Dia. of Band Small End B1 (min) | Outside Dia. of Large End B2 (min) | Length of Threads Small End C1 (min) | Length of Threads Large End C2 (min) | Take Out | Take Out |
|---------------|----------------------|-----------------------------------------|------------------------------------|--------------------------------------|--------------------------------------|----------|----------|
| 3/4 x 1/2     | 1.52                 | 1.34                                    | 1.63                               | 0.43                                 | 0.58                                 | 0.21     | 0.23     |
| 1 x 3/4       | 1.60                 | 1.63                                    | 1.95                               | 0.50                                 | 0.58                                 | 0.12     | 0.25     |
| 1 x 1/2       | 1.59                 | 1.34                                    | 1.95                               | 0.43                                 | 0.58                                 | 0.11     | 0.26     |
| 1 1/4 x 1     | 1.75                 | 1.95                                    | 2.39                               | 0.58                                 | 0.67                                 | 0.17     | 0.19     |
| 1 1/4 x 3/4   | 1.65                 | 1.63                                    | 2.39                               | 0.50                                 | 0.67                                 | 0.12     | 0.28     |
| 1 1/4 x 1/2   | 1.58                 | 1.34                                    | 2.39                               | 0.43                                 | 0.67                                 | 0.08     | 0.26     |
| 1 1/2 x 1 1/4 | 1.85                 | 2.39                                    | 2.68                               | 0.67                                 | 0.70                                 | 0.20     | 0.22     |
| 1 1/2 x 1     | 1.78                 | 1.95                                    | 2.68                               | 0.58                                 | 0.70                                 | 0.17     | 0.21     |
| 1 1/2 x 3/4   | 1.68                 | 1.63                                    | 2.68                               | 0.50                                 | 0.70                                 | 0.12     | 0.29     |
| 1 1/2 x 1/2   | 2.12                 | 2.68                                    | 3.28                               | 0.70                                 | 0.75                                 | 0.09     | 0.28     |
| 2 x 1 1/2     | 2.12                 | 2.39                                    | 3.28                               | 0.67                                 | 0.75                                 | 0.30     | 0.34     |
| 2 x 1 1/4     | 1.99                 | 1.95                                    | 3.28                               | 0.58                                 | 0.75                                 | 0.30     | 0.35     |
| 2 x 1         | 1.79                 | 1.63                                    | 3.28                               | 0.50                                 | 0.75                                 | 0.24     | 0.31     |
| 2 x 3/4       | —                    | —                                       | —                                  | —                                    | —                                    | —        | —        |
| 2 x 1/2       | —                    | —                                       | —                                  | —                                    | —                                    | —        | —        |
| 2 1/2 x 2     | —                    | —                                       | —                                  | —                                    | —                                    | —        | —        |
| 2 1/2 x 1 1/2 | —                    | —                                       | —                                  | —                                    | —                                    | —        | —        |
| 2 1/2 x 1 1/4 | —                    | —                                       | —                                  | —                                    | —                                    | —        | —        |
| 2 1/2 x 1     | —                    | —                                       | —                                  | —                                    | —                                    | —        | —        |
| 3 x 2 1/2     | —                    | —                                       | —                                  | —                                    | —                                    | —        | —        |
| 3 x 2         | —                    | —                                       | —                                  | —                                    | —                                    | —        | —        |
| 3 x 1 1/2     | —                    | —                                       | —                                  | —                                    | —                                    | —        | —        |
| 3 x 1 1/4     | —                    | —                                       | —                                  | —                                    | —                                    | —        | —        |
| 3 x 1         | —                    | —                                       | —                                  | —                                    | —                                    | —        | —        |
| 4 x 2 1/2     | —                    | —                                       | —                                  | —                                    | —                                    | —        | —        |
| 4 x 2         | —                    | —                                       | —                                  | —                                    | —                                    | —        | —        |
| 4 x 1 1/2     | —                    | —                                       | —                                  | —                                    | —                                    | —        | —        |
| 4 x 1 1/4     | —                    | —                                       | —                                  | —                                    | —                                    | —        | —        |



## CAST IRON PIPE CAP CLASS 125

| NPS   | Overall Height A | Outside Dia. of Band B (min) | Length of Threads C (min) |
|-------|------------------|------------------------------|---------------------------|
| 2 1/2 | 1.810            | 3.860                        | 0.920                     |
| 3     | 1.910            | 4.620                        | 0.980                     |
| 3 1/2 | 2.030            | 5.200                        | 1.030                     |
| 4     | 2.220            | 5.790                        | 1.080                     |
| 5     | 2.380            | 7.050                        | 1.180                     |
| 6     | 2.630            | 8.280                        | 1.280                     |
| 8     | 2.880            | 10.630                       | 1.470                     |



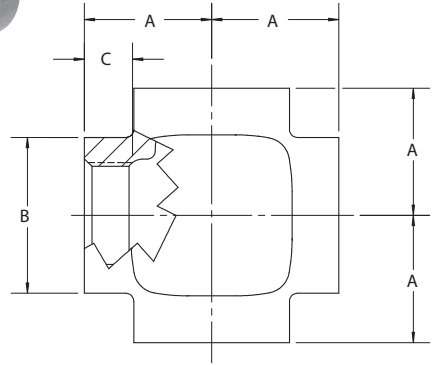
## CAST IRON HEXAGON COUPLING

| NPS | Width Across Flats A HEX. | Overall Length B | Thread Length C | Take Out | Take Out |
|-----|---------------------------|------------------|-----------------|----------|----------|
| 1   | 1.94                      | 1.69             | 0.58            | 0.16     | 0.16     |



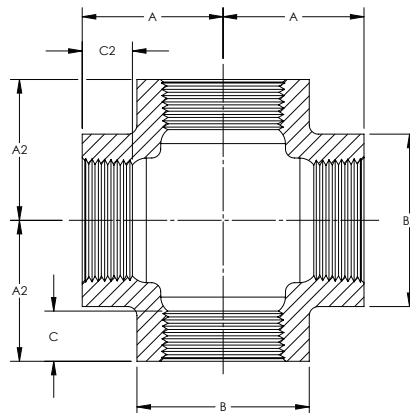
## CAST IRON STRAIGHT CROSS CLASS 125

| NPS   | Center to End A | Outside Dia. Band B (min) | Length of Threads C (min) | Take Out |
|-------|-----------------|---------------------------|---------------------------|----------|
| 1/2   | 1.25            | 1.34                      | 0.43                      | 0.71     |
| 3/4   | 1.44            | 1.63                      | 0.50                      | 0.89     |
| 1     | 1.63            | 1.95                      | 0.58                      | 0.94     |
| 1 1/4 | 1.94            | 2.39                      | 0.67                      | 1.23     |
| 1 1/2 | 2.13            | 2.68                      | 0.70                      | 1.40     |
| 2     | —               | —                         | —                         | —        |
| 4     | —               | —                         | —                         | —        |



## CAST IRON REDUCING CROSS CLASS 125

| NPS                   | Center to End A | Center to End A2 | Outside Dia. Band B (min) | Outside Dia. Band B2 (min) | Length of Threads C (min) | Length of Threads C2 (min) | Take Out | Take Out |
|-----------------------|-----------------|------------------|---------------------------|----------------------------|---------------------------|----------------------------|----------|----------|
| 1 1/4 x 1             | 1.67            | 1.58             | 2.39                      | 1.95                       | 0.67                      | 0.58                       | 0.96     | 0.89     |
| 1 1/2 x 1 1/4         | —               | —                | —                         | —                          | —                         | —                          | —        | —        |
| 1 1/2 x 1 1/4 x 1     | —               | —                | —                         | —                          | —                         | —                          | —        | —        |
| 1 1/2 x 1 1/4 x 1 x 1 | —               | —                | —                         | —                          | —                         | —                          | —        | —        |
| 1 1/2 x 1             | 1.80            | 1.65             | 2.68                      | 1.95                       | 0.70                      | 0.58                       | 1.07     | 0.96     |
| 1 1/2 x 1 x 1 x 1     | —               | —                | —                         | —                          | —                         | —                          | —        | —        |
| 2 x 1 1/2             | —               | —                | —                         | —                          | —                         | —                          | —        | —        |
| 2 x 1 1/4             | —               | —                | —                         | —                          | —                         | —                          | —        | —        |
| 2 x 1 1/2 x 1 x 1     | —               | —                | —                         | —                          | —                         | —                          | —        | —        |
| 2 x 1                 | 2.02            | 1.73             | 3.28                      | 1.95                       | 0.75                      | 0.58                       | 1.26     | 1.04     |



## CAST IRON 90° STRAIGHT ELL CLASS 250

| NPS   |
|-------|
| 1/2   |
| 3/4   |
| 1     |
| 1 1/4 |
| 1 1/2 |
| 2     |
| 2 1/2 |



## CAST IRON 45° STRAIGHT ELL CLASS 250

| NPS   |
|-------|
| 1/2   |
| 3/4   |
| 1     |
| 1 1/4 |
| 1 1/2 |
| 2     |
| 2 1/2 |



## CAST IRON STRAIGHT TEE CLASS 250

| NPS   |
|-------|
| 3/8   |
| 1/2   |
| 3/4   |
| 1     |
| 1 1/4 |
| 1 1/2 |
| 2     |
| 2 1/2 |



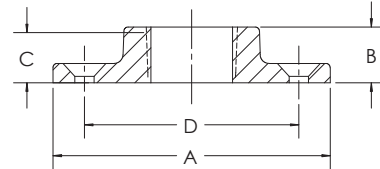
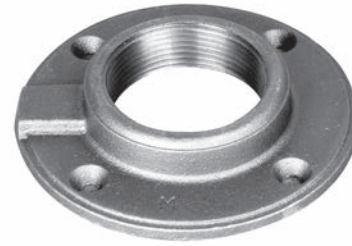
## CAST IRON REDUCING TEE CLASS 250

| NPS                 |
|---------------------|
| 1 1/4 x 1 1/4 x 3/4 |
| 1 1/2 x 1 1/2 x 3/4 |
| 2 x 2 x 3/4         |
| 2 x 2 x 1 1/2       |



## MALLEABLE IRON FLOOR FLANGE

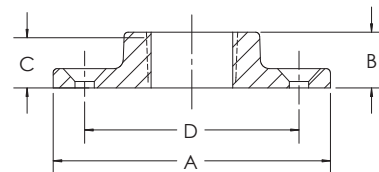
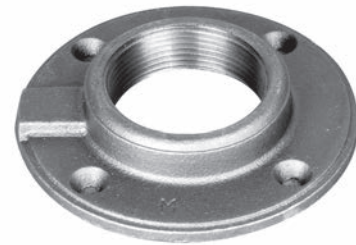
| NPS    | Outside Flange Dia. A | Overall Height B (min) | Length of Threads C (min) | Number of Bolt Holes | Bolt Hole Size | Bolt Circle Dia. D |
|--------|-----------------------|------------------------|---------------------------|----------------------|----------------|--------------------|
| *1/4   | 2.37                  | 0.46                   | 0.32                      | 3                    | 0.27           | 1.86               |
| *3/8   | 2.93                  | 0.52                   | 0.36                      | 4                    | 0.27           | 1.93               |
| *1/2   | 3.00                  | 0.65                   | 0.43                      | 4                    | 0.24           | 2.10               |
| *3/4   | 3.25                  | 0.65                   | 0.50                      | 4                    | 0.25           | 2.31               |
| *1     | 3.87                  | 0.77                   | 0.58                      | 4                    | 0.27           | 3.00               |
| *1 1/4 | 3.87                  | 0.77                   | 0.67                      | 4                    | 0.27           | 3.00               |
| *1 1/2 | 4.50                  | 0.99                   | 0.70                      | 4                    | 0.30           | 3.60               |
| *2     | 5.50                  | 1.00                   | 0.75                      | 4                    | 0.39           | 4.25               |
| *2 1/2 | 5.81                  | 1.06                   | 0.92                      | 4                    | 0.33           | 4.79               |
| *3     | 6.37                  | 1.10                   | 0.98                      | 6                    | 0.31           | 5.18               |
| *4     | 7.93                  | 1.10                   | 1.05                      | 5                    | 0.38           | 6.70               |



\* Manufactured to WARD specifications

## CAST IRON FLOOR FLANGE

| NPS    | Outside Flange Dia. A | Overall Height B (min) | Length of Threads C (min) | Number of Bolt Holes | Bolt Hole Size | Bolt Circle Dia. D |
|--------|-----------------------|------------------------|---------------------------|----------------------|----------------|--------------------|
| *1/4   | 2.37                  | 0.46                   | 0.32                      | 3                    | 0.27           | 1.60               |
| *3/8   | 2.93                  | 0.52                   | 0.36                      | 4                    | 0.27           | 1.93               |
| *1/2   | 3.00                  | 0.65                   | 0.43                      | 4                    | 0.24           | 2.10               |
| *3/4   | 3.25                  | 0.65                   | 0.50                      | 4                    | 0.25           | 2.31               |
| *1     | 3.87                  | 0.77                   | 0.58                      | 4                    | 0.27           | 3.00               |
| *1 1/4 | 3.87                  | 0.77                   | 0.67                      | 4                    | 0.27           | 3.00               |
| *1 1/2 | 4.50                  | 0.99                   | 0.70                      | 4                    | 0.30           | 3.60               |
| *2     | 5.50                  | 1.00                   | 0.75                      | 4                    | 0.39           | 4.25               |
| *2 1/2 | 5.81                  | 1.06                   | 0.92                      | 4                    | 0.33           | 4.79               |
| *3     | 6.37                  | 1.10                   | 0.98                      | 6                    | 0.31           | 5.18               |
| *4     | 7.93                  | 1.10                   | 1.05                      | 5                    | 0.38           | 6.70               |

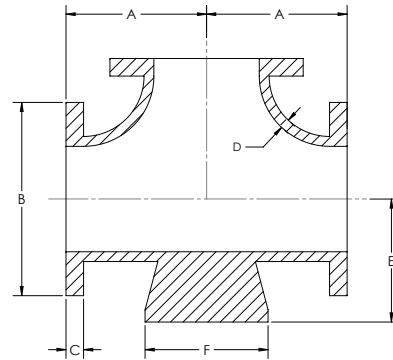
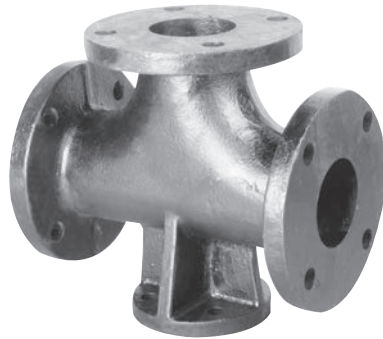


\* Manufactured to WARD specifications

## CAST IRON FLANGED STRAIGHT STANDARD BASE TEES CLASS 125

| NPS | Center to Face A | Outside Flange Dia. B | Thickness of Flange C (min) | Wall Thickness D | Height of Base E | Round and Square Base F | Number of Bolt Holes | Bolt Hole Size | Bolt Circle Dia. | Dia. of Bolt | Length of Bolts |
|-----|------------------|-----------------------|-----------------------------|------------------|------------------|-------------------------|----------------------|----------------|------------------|--------------|-----------------|
| 3   | 5.500            | 7.500                 | 0.750                       | 0.380            | 4.875            | 5.000                   | 4                    | 3/4            | 6                | 5/8          | 2 1/2           |
| 4   | 6.500            | 9.000                 | 0.940                       | 0.500            | 5.500            | 6.000                   | 8                    | 3/4            | 7 1/2            | 5/8          | 3               |
| 5   | 7.500            | 10.000                | 0.940                       | 0.500            | 7.000            | 7.000                   | 8                    | 7/8            | 8 1/2            | 3/4          | 3               |
| 6   | 8.000            | 11.000                | 1.000                       | 0.560            | 7.000            | 7.000                   | 8                    | 7/8            | 9 1/2            | 3/4          | 3 1/4           |
| 8   | 9.000            | 13.500                | 1.120                       | 0.620            | 8.375            | 9.000                   | 8                    | 7/8            | 11 3/4           | 3/4          | 3 1/2           |
| 10  | 11.000           | 16.000                | 1.190                       | 0.750            | 9.750            | 9.000                   | 12                   | 1              | 14 1/4           | 7/8          | 3 3/4           |
| 12  | 12.000           | 19.000                | 1.250                       | 0.810            | 11.250           | 11.000                  | 12                   | 1              | 17               | 7/8          | 3 3/4           |

Metalfit flanged straight standard base tee class made in North America.



## SECTION 8

## CAST IRON DRAINAGE FITTINGS



WARD cast iron drainage fittings, shown on the following pages, are designed especially for drainage systems using wrought pipe. The inside diameter of the fitting is the same as that of wrought pipe.

WARD drainage fittings are made with an interior shoulder, so that when the joint is made the end of the pipe practically meets the shoulder. This forms a continuous unobstructed surface providing smooth flow of the pipe contents.

WARD 90 degree ells, except for the street ells, are pitched 1/4 inch per foot. WARD drainage fittings meet existing requirements for the sanitary codes and are manufactured in strict accordance with an American National Standard.

### IMPORTANT

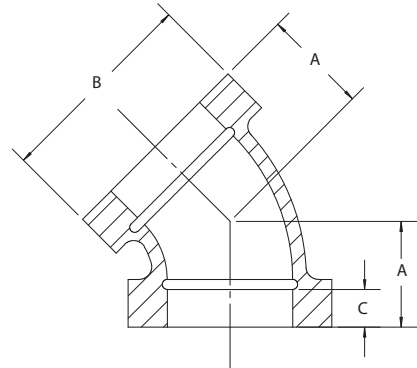
Be sure to specify the type of finish desired. As with the rest of the WARD line of fittings, drainage can be supplied in black or galvanized.

| NPS   | Thread Length (min) | Total Length of Chamber to Shoulder | I.D. of Fittings | Wall Thickness (min) | O.D. of Band (min) |
|-------|---------------------|-------------------------------------|------------------|----------------------|--------------------|
| 1 1/4 | 0.42                | 0.71                                | 1.38             | 0.18                 | 2.39               |
| 1 1/2 | 0.42                | 0.72                                | 1.61             | 0.20                 | 2.68               |
| 2     | 0.44                | 0.76                                | 2.07             | 0.22                 | 3.28               |
| 2 1/2 | 0.68                | 1.14                                | 2.47             | 0.24                 | 3.86               |
| 3     | 0.77                | 1.20                                | 3.07             | 0.26                 | 4.62               |
| 4     | 0.84                | 1.30                                | 4.03             | 0.31                 | 5.79               |

|                                   |                                           |
|-----------------------------------|-------------------------------------------|
| <b>Material:</b>                  | <b>ASTM A 126<br/>Class A Minimum</b>     |
| <b>Dimensions:</b>                | <b>ASME B16.12<br/>ANSI/ASME B.1.20.1</b> |
| <b>Pressure Rating:</b>           | <b>ASME B16.12</b>                        |
| <b>Coatings:</b>                  | <b>ASTM A153</b>                          |
| <b>Additional Specifications:</b> | <b>UL, ULC AND FM, where applicable</b>   |

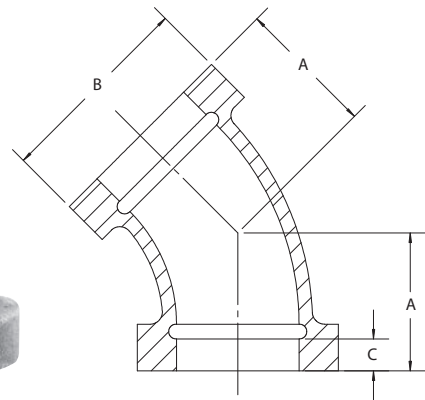
## CAST IRON DRAINAGE 45° ELL SHORT TURN

| NPS   | Center to End A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|-----------------|------------------------------|---------------------------|----------|
| 1 1/4 | 1.31            | 2.39                         | 0.42                      | 0.60     |
| 1 1/2 | 1.44            | 2.68                         | 0.42                      | 0.71     |
| 2     | 1.69            | 3.28                         | 0.44                      | 0.93     |
| 3     | 2.19            | 4.62                         | 0.77                      | 0.99     |
| 4     | 2.63            | 5.79                         | 0.84                      | 1.33     |



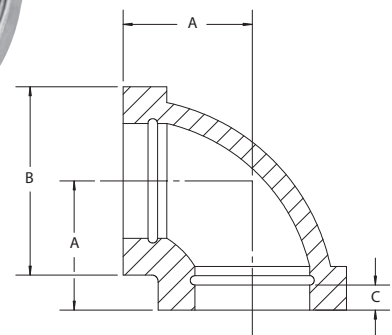
## CAST IRON DRAINAGE 45° ELL LONG TURN

| NPS   | Center to End A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|-----------------|------------------------------|---------------------------|----------|
| 1 1/2 | —               | —                            | —                         | —        |
| 2     | 2.25            | 3.28                         | 0.44                      | 1.49     |



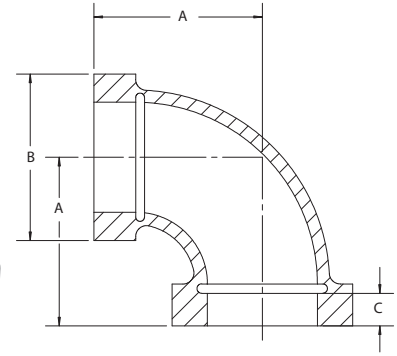
## CAST IRON DRAINAGE 90° STRAIGHT ELL SHORT TURN

| NPS           | Center to End A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out  |
|---------------|-----------------|------------------------------|---------------------------|-----------|
| 1 1/4         | 1.75            | 2.39                         | 0.42                      | 1.04      |
| 1 1/2         | 1.94            | 2.68                         | 0.42                      | 1.21      |
| 2             | 2.25            | 3.28                         | 0.44                      | 1.49      |
| 3             | 3.06            | 4.62                         | 0.77                      | 1.86      |
| 4             | 3.81            | 5.79                         | 0.84                      | 2.51      |
| 1 1/2 x 1 1/4 | —               | —                            | —                         | —         |
| 2 x 1 1/2     | 2.25            | 3.28                         | 0.44                      | 1.49/1.21 |



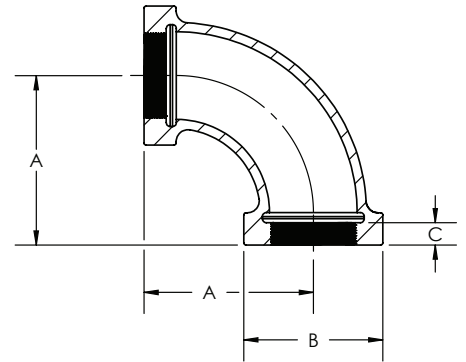
## CAST IRON DRAINAGE 90° STRAIGHT ELL LONG TURN

| NPS   | Center to End A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|-----------------|------------------------------|---------------------------|----------|
| 1 1/2 | 2.50            | 2.68                         | 0.42                      | 1.77     |
| 2     | 3.06            | 3.28                         | 0.44                      | 2.30     |
| 3     | 4.25            | 4.62                         | 0.77                      | 3.00     |



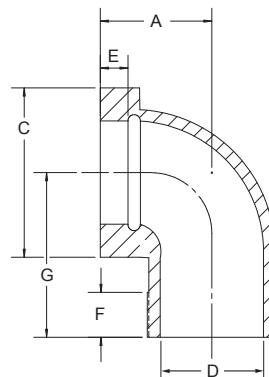
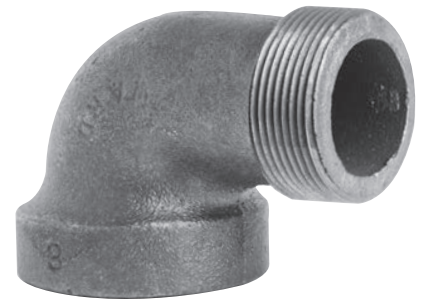
## CAST IRON DRAINAGE 90° STRAIGHT ELL EXTRA LONG TURN

| NPS   | Center to End A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|-----------------|------------------------------|---------------------------|----------|
| 1 1/2 | 3.50            | 2.68                         | 0.42                      | 2.77     |
| 2     | 4.00            | 3.28                         | 0.44                      | 3.24     |



## CAST IRON DRAINAGE 90° STREET ELL

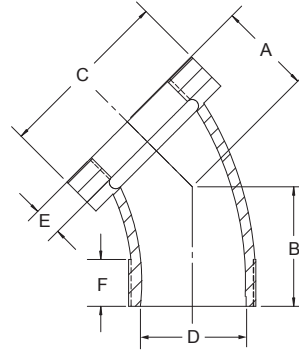
| NPS   | Center to End A | Center to Male B | Outside Dia. of Band C (min) | Port Dia. Male End D (max) | Length of Internal Threads E (min) | Length of External Threads F (min) | Take Out Male End | Take Out Female End |
|-------|-----------------|------------------|------------------------------|----------------------------|------------------------------------|------------------------------------|-------------------|---------------------|
| 1 1/2 | 1.98            | 2.86             | 2.68                         | 1.35                       | 0.42                               | 0.85                               | 2.13              | 1.25                |
| 2     | —               | —                | —                            | —                          | —                                  | —                                  | —                 | —                   |





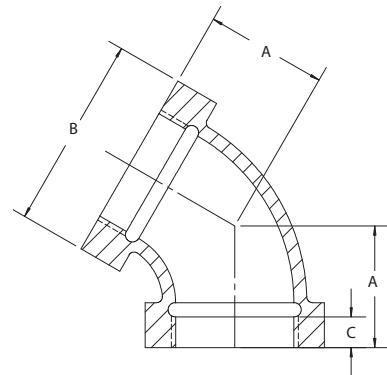
## CAST IRON DRAINAGE 45° STREET ELL

| NPS   | Center to End A | Center to Male B | Outside Dia. of Band C (min) | Port Dia. Male End D (max) | Length of Internal Threads E (min) | Length of External Threads F (min) | Take Out Male End | Take Out Female End |
|-------|-----------------|------------------|------------------------------|----------------------------|------------------------------------|------------------------------------|-------------------|---------------------|
| 1 1/2 | 1.50            | 1.87             | 2.68                         | 1.35                       | 0.42                               | 0.85                               | 1.15              | 0.77                |
| 2     | 1.65            | 2.30             | 3.28                         | 1.75                       | 0.44                               | 0.87                               | 1.54              | 0.89                |



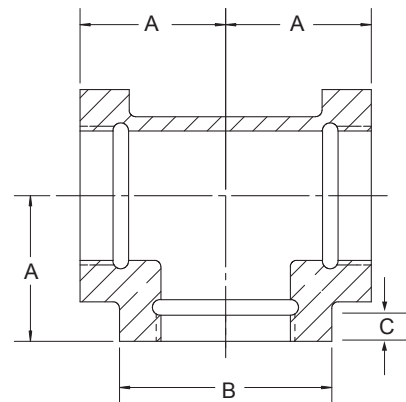
## CAST IRON DRAINAGE 60° STREET ELL SHORT TURN

| NPS   | Center to End A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|-----------------|------------------------------|---------------------------|----------|
| 1 1/2 | 1.75            | 2.68                         | 0.42                      | 1.02     |
| 2     | 2.06            | 3.28                         | 0.44                      | 1.30     |



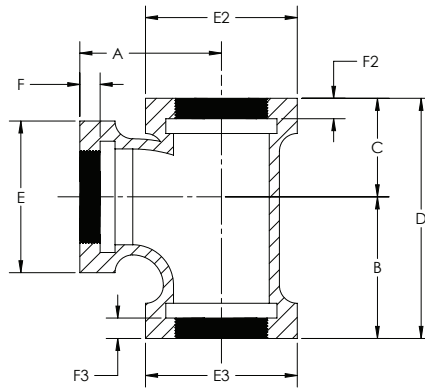
## CAST IRON DRAINAGE STRAIGHT TEE

| NPS     | Center to End A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|---------|-----------------|------------------------------|---------------------------|----------|
| 1 1/2   | 1.94            | 2.68                         | 0.42                      | 1.21     |
| 2       | 2.25            | 3.28                         | 0.44                      | 1.49     |
| 2 X 1/2 | 2.25            | 3.28                         | 0.44                      | 1.49     |



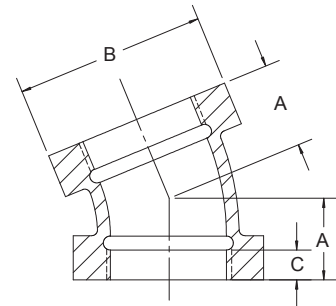
## CAST IRON DRAINAGE 90° "TY" SHORT TURN

| NPS               | Center to End Inlet A | Center to End Outlet B | Center to End C | End to End D | Outside Dia. of Band E (min) | Outside Dia. of Band E2 (min) | Outside Dia. of Band E3 (min) | Length of Threads F (min) | Length of Threads F2 (min) | Length of Threads F3 (min) | Take Out | Take Out |
|-------------------|-----------------------|------------------------|-----------------|--------------|------------------------------|-------------------------------|-------------------------------|---------------------------|----------------------------|----------------------------|----------|----------|
| 1 1/2             | 2.50                  | 2.50                   | 1.75            | 4.25         | 2.68                         | 2.68                          | 2.68                          | 0.42                      | 0.42                       | 0.42                       | 1.78     | 1.78     |
| 2                 | 3.06                  | 3.06                   | 2.13            | 5.19         | 3.28                         | 3.28                          | 3.28                          | 0.44                      | 0.44                       | 0.44                       | 2.30     | 2.30     |
| 4                 | 5.19                  | 5.19                   | 3.56            | 8.75         | 5.79                         | 5.79                          | 5.79                          | 0.84                      | 0.84                       | 0.84                       | 3.89     | 3.89     |
| 2 x 1 1/2         | 2.94                  | 2.69                   | 1.94            | 4.63         | 3.28                         | 3.28                          | 2.68                          | 0.44                      | 0.44                       | 0.42                       | 2.18     | 1.93     |
| 2 x 1 1/2 x 1 1/2 | 2.94                  | 2.69                   | 1.94            | 4.63         | 3.28                         | 2.68                          | 2.68                          | 0.44                      | 0.420                      | 0.42                       | 2.18     | 1.93     |
| 2 x 1 1/2 x 2     | 3.06                  | 3.06                   | 2.13            | 5.19         | 3.28                         | 2.68                          | 3.28                          | 0.44                      | 0.42                       | 0.44                       | 2.30     | 2.30     |



## CAST IRON DRAINAGE 22 1/2° ELLS SHORT TURN

| NPS   | Center to End A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|-----------------|------------------------------|---------------------------|----------|
| 1 1/2 | 1.25            | 2.68                         | 0.42                      | 0.52     |
| 2     | 1.44            | 3.28                         | 0.44                      | 0.68     |



## CAST IRON DRAINAGE 11 1/4° ELLS SHORT TURN

| NPS   | Center To End A | Outside Dia. of Band B (min) | Length of Threads C (min) | Take Out |
|-------|-----------------|------------------------------|---------------------------|----------|
| 1 1/2 | 1.25            | 2.68                         | 0.42                      | 0.52     |
| 2     | 1.38            | 3.28                         | 0.44                      | 0.62     |

