# BIG BLUE™

## MEETS AWWA C905

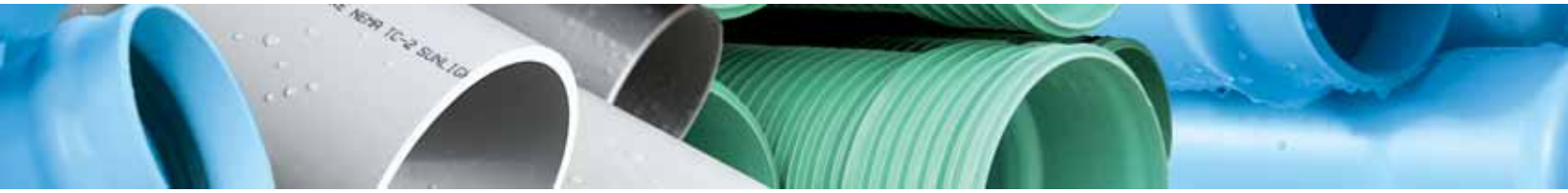
JM Eagle™

*Building essentials for a better tomorrow™*

# BIG BLUE™

**PVC C.I.O.D. Transmission Pipe**
**DR 51/DR 41/DR 32.5/DR 25/DR 21/DR 18**

*Pressure Rated 80, 100, 125, 165, 200 & 235 psi*
*Ring-Tite™ Joints 14"-48"*



# BIG BLUE™

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# 01

# PRODUCT DESCRIPTION

## AWWA C905 BIG BLUE™

FOR USE IN TRANSMISSION, MUNICIPAL WATER SYSTEMS AND OTHER SERVICES

### DESCRIPTION

JM Eagle's Big Blue™ pipe conforms to AWWA C905 specification with gaskets meeting ASTM F477 and joints in compliance with ASTM D3139. Big Blue™ water pipe has the long-term hydrostatic strength to meet the accepted high safety requirements of municipal water systems. This pipe conforms to cast iron O.D.'s and is available in DR 18 (235 psi) for sizes 14"-24" in diameter; DR 21 (200 psi) for sizes 14"-36" in diameter; DR 32.5 (125 psi); DR 25 (165 psi) and DR 41 (100 psi) for sizes 14"-48" in diameter; and DR 51 (80 psi) for sizes 30"-48" in diameter.

### LONG LAYING LENGTHS

The standard laying length of Big Blue™ PVC pipe is 20 feet. This means that more ground can be covered during installation while eliminating the cost of unnecessary joints. For lengths of 14 feet, Non-Hydrotested pipe is available upon request.

### MEETS AWWA C905, ANSI/NSF 61 AND ANSI/UL 1285 (14"-24")

See Short Form Specification.

### APPLICATIONS

These products are typically used for transmission pipelines of potable water. However, these pipes may be used for gravity sewer, force main, and water reclamation projects where local ordinances allow. The pressure rating of these pipes indicate the maximum allowable sustained pressure capacity with a long-term 2 to 1 safety factor.

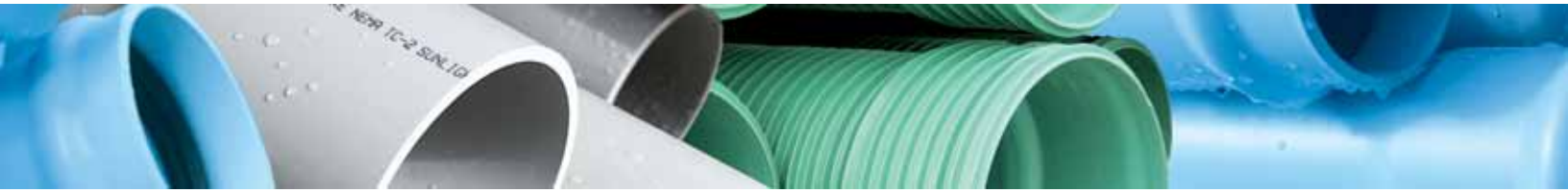
### PURPLE RECLAIM AND GREEN SEWER FORCE MAIN

JM Eagle™ also manufactures this pipe in purple for reclaimed water systems, and green for sewer force main applications. This pipe is made to the same requirements as our standard products. The only difference is that the pigment used is purple or green. These products will not be marked with the UL or NSF listing marks. Additionally, the purple pipe will be marked: "Reclaimed Water... Do Not Drink" and the green pipe will be marked "Forced Sewer."

### QUALITY CONTROL

Without exception, each 20 foot length of pipe is hydrostatically tested and subject to inspection by our quality control inspectors throughout every step of the manufacturing process. JM Eagle's Quality Management System is ISO 9001: 2000 registered. Copies of the registration certificates are available on our website at *www.jmeagle.com.*

* JM Eagle™ is in the process of obtaining the ISO 9001-2000 registration of Quality Management System for all locations.



## CORROSION RESISTANCE

Big Blue™ PVC pipe is unaffected by electrolytic or galvanic corrosion, or any known corrosive soil or water conditions. You don't have to worry about tuberculation, or the need for costly lining, wrapping, coating, or cathodic protection.

## FLOW CAPACITY

This PVC water pipe has a smooth interior that stays smooth over long years of service with virtually no loss in carrying capacity. Its coefficient of flow is C = 150 (Hazen & Williams) the best available in common use water systems. This capacity often allows savings in pumping costs as well as savings on the size of pipe required.

## FIELD CUTTING AND BEVELING

In most cases, you can cut Big Blue™ pipe with a power saw or ordinary handsaw. This eliminates the need to invest in costly cutting equipment. The pipe can also be beveled without the use of any expensive or complicated machinery.

## LIGHT WEIGHT

A 20-foot length of 16" DR 25 Big Blue™ water pipe weighs approximately 500 pounds. Installers prefer it because it goes into the ground quickly—thus saving on installation costs.

## SERVICE LIFE

Since PVC does not corrode and is resistant to most chemicals, the pipe does not lose strength due to either potable water corrosion or external galvanic soil conditions. The design of the pipe allows for a 2 to 1 long-term safety factor at the marked capacity of the pipe.

## INSTALLATION

This product should be installed in accordance with JM Eagle's Publication JME-03B, "Blue Brute™, Big Blue™, and Ultra Blue™ (C900/C905/C909) Installation Guide" and Uni-Bell® Publication UNI-PUB-08-07, "Tapping Guide for PVC Pressure Pipe."

# PRODUCT DESCRIPTION

## AWWA C905 BIG BLUE™

(CONTINUED)

### CAST IRON O.D.

Available in 14", 16", 18", 20", 24", 30", 36", 42" and 48" trade sizes, this pipe can be connected directly into cast/ductile iron fittings and pipe. Connections to products with other O.D. regimens can be done using commonly available adapters or transition gaskets. Dimensions should be checked for use with butterfly valves.

### RING-TITE™ JOINTS WITH LOCKED-IN GASKETS

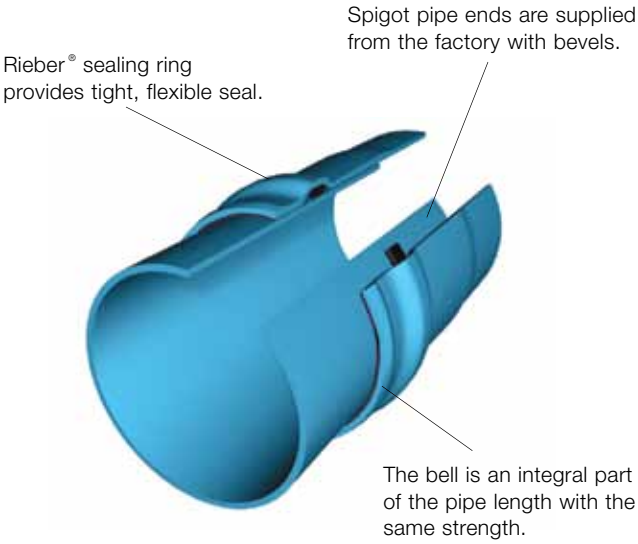
JM Eagle's Ring-Tite™ joint can be assembled quickly. Seated in a deep groove, the flexible elastomeric Rieber®* gasket provides a tight seal that protects the line from shock, vibration, earth movement and compensates for expansion and contraction of pipe lengths. There's no field mixing or application of cement. It's a simple push-together joint that remains tight under normal operating conditions.

The factory installed Rieber® gaskets provide a tight, flexible seal, that resists rolling during installation. Special gasket types are available for use with certain chemical and petroleum products. Spigot pipe ends are supplied from the factory with bevels. The bell is an integral part of the pipe length with the same strength. Joints meet or exceed ASTM D3139 for joint tightness, including a 22 in. Hg vacuum for one hour, under deflection with no leakage.

**Note:** Other types of gaskets may be provided. JM Eagle™ is in the process of converting all gasketed products to the Rieber® ring gasket.

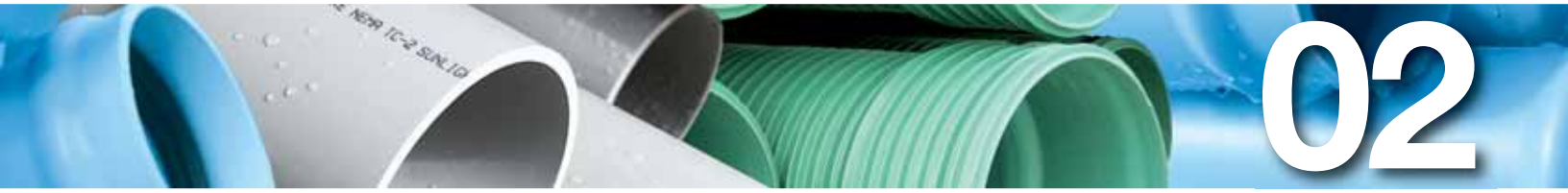
* Rieber® is a registered trademark of TI Specialty Products Inc.

### RING-TITE™ JOINT




### ACCESSORIES

JM Eagle's Big Blue™ PVC pipe is compatible with all the items required for smooth installation of transmission pipelines.



02

# SURGE DESIGN

## SURGE PRESSURES IN VARIOUS PRESSURE PIPE

It is important to note that for the same conditions of interrupted flow, the surge pressures generated in pipe with high tensile moduli will be greater than the surges in low moduli (PVC) pipe of similar dimensions.

As the modulus of tensile elasticity for a piping material increases, the resultant pressure surge, or “water-hammer”, caused by a change in flow velocity also increases. For example, an instantaneous 2 fps ( 0.6 mps ) flow velocity change in an 18" water main will create surge pressures as shown in **Table 1** for different pipe materials. For all system designs, surge pressures should be examined with the pipe material in use.

*TABLE 1*

### PRESSURE SURGES IN 18 IN. WATER MAIN

In Response to 2 fps (0.6 mps) Instantaneous Flow Velocity Change.

| PIPE PRODUCT | PRESSURE SURGE | |
|---|---|---|
| | psi | kPa |
| Class 50 DI Pipe | 100.0 | 689 |
| Class 150 AC Pipe | 88.7 | 611 |
| 165 psi (DR 25) PVC Pipe | 29.4 | 202 |

Pressure surges in PVC pipe of different dimension ratios in response to a 1 fps (0.3 mps) instantaneous flow velocity change are shown in **Table 2**.

*TABLE 2*

### DESIGN TABLE FOR PVC PIPE-PRESSURE SURGE VS. DIMENSION RATIO

In Response to 1 fps (0.3 mps) Instantaneous Flow Velocity Change.

| DIMENSION RATIO | PRESSURE SURGE | |
|---|---|---|
| | psi | kPa |
| 13.5 | 20.2 | 139 |
| 14 | 19.8 | 137 |
| 17 | 17.9 | 123 |
| 18 | 17.4 | 120 |
| 21 | 16.0 | 110 |
| 25 | 14.7 | 101 |
| 26 | 14.4 | 99 |
| 32.5 | 12.8 | 88 |
| 41 | 11.4 | 79 |
| 51 | 10.8 | 74 |

# 03

# SHORT FORM SPECIFICATION

## AWWA C905 BIG BLUE™

### SCOPE

This specification designates general requirements for 14" through 48" unplasticized polyvinyl chloride (PVC) plastic water pipe with integral bell and spigot joints for the conveyance of water and other fluids. This pipe shall meet AWWA C905 ANSI/NSF-61 and ANSI/UL 1285 (14"-24").

### MATERIALS

This pipe shall meet the requirements of AWWA Standard C905 "Polyvinyl Chloride (PVC) Water Transmission Pipe." All pipe shall be made from quality PVC resin, compounded to provide physical and mechanical properties that equal or exceed cell class 12454 as defined in ASTM D1784.

### HYDROSTATIC PROOF TESTING

Each standard and random length of pipe is tested to two times the rated pressure of the pipe for a minimum of 5 seconds. The integral bell shall be tested with the pipe.

### STANDARD LAYING LENGTHS

Standard laying lengths are 20 feet for all sizes. For lengths of 14 feet, Non-Hydrotested pipe is available upon request.

### PIPE

When specified as such, all pipe shall be suitable for use as pressure conduit. Provisions must be made for expansion and contraction at each joint with an elastomeric gasket. The bell shall consist of an integral wall section with a factory installed, solid cross section Rieber/other elastomeric gasket, which meets the requirements of ASTM F477. The bell section shall be designed to be at least as hydrostatically strong as the pipe barrel and meet the requirements of AWWA C905. The joint design shall meet requirements of ASTM D3139, under both pressure and 22 in. Hg vacuum. Sizes and dimensions shall be as shown in this specification.

Pipe installation and usage shall be in compliance with JM Eagle's Publication JME-03B, "Blue Brute™, Big Blue™ and Ultra Blue's C900/C905/C909 Installation Guide" and Uni-Bell® Publication UNI-PUB-0807, "Tapping Guide for PVC Pressure Pipe."

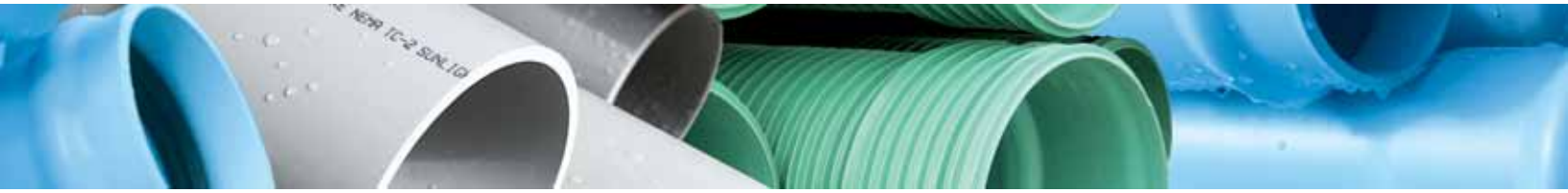
### QUICK BURST TEST

Randomly selected samples tested in accordance with ANSI/UL 1285 shall withstand, without failure, the pressures listed below when applied for 60-70 seconds. This test is performed on pipe sizes less than 30".

### FLATTENING TEST

| DR | PRESSURE RATING (psi) | MINIMUM BURST |
|---|---|---|
| 18 | 235 | 755 |
| 25 | 165 | 535 |
| 32.5 | 125 | 400 |
| 41 | 100 | 315 |
| 51 | 80 | 255 |

Specimens of pipe, a minimum of 6 in. (150 mm) long, shall be flattened between parallel plates in a suitable press until the distance between the plates is 40 percent of the OD of the pipe. The rate of flattening shall be uniform and such that the compression is completed within 2 to 5 minutes. There shall be no evidence of splitting, cracking or breaking.



## TESTING REQUIREMENTS FOR AWWA C905

| TEST | AWWA C905 | | | | |
|---|---|---|---|---|---|
| | 80 psi | 100 psi | 125 psi | 165 psi | 235 psi |
| **SHORT TERM BURST TEST (psi) less than 30"** | 255 | 315 | 400 | 535 | 755 |
| **EXTRUSION QUALITY OF PVC PIPE BY ACETONE IMMERSION TEST METHOD ASTM D2152** | 20 min | 20 min | 20 min | 20 min | 20 min |
| **FLATTENING TEST** Tests extrusion quality and ductility under slow loading conditions (Flattening Capability) | 40% of OD between the plates within 2-5 min | 40% of OD between the plates within 2-5 min | 40% of OD between the plates within 2-5 min | 40% of OD between the plates within 2-5 min | 40% of OD between the plates within 2-5 min |
| **HYDROSTATIC PROOF TEST (each piece) (psi)** | 160 | 200 | 250 | 330 | 470 |

## TYPICAL PHYSICAL AND CHEMICAL PROPERTIES AND CAPACITIES

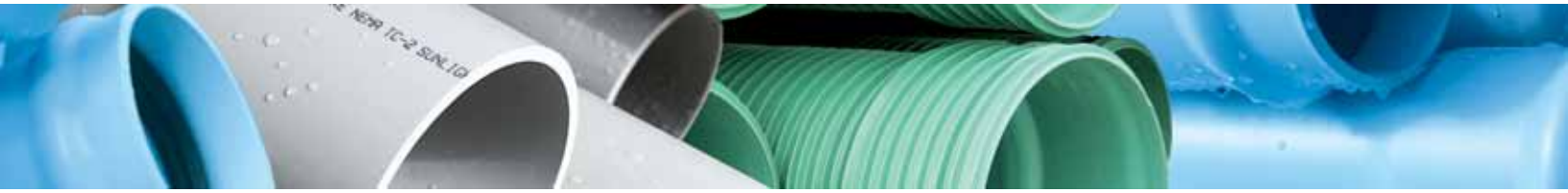
| PROPERTY | AWWA C905 BIG BLUE™ PVC PIPE | ASTM TEST METHOD |
|---|---|---|
| **Hoop Stress at 73°F** Minimum Short Term Bursting Strength (psi) | 6400 | D1599 |
| **Working Pressure Rating** 73°F (% of rating at 73°F) 80°F (% of rating at 73°F) 100°F (% of rating at 73°F) | 100% 88% 62% | — |
| **Chemical Resistance at 73°F** Acids Salts-Bases Aliphatic Hydrocarbons (including crude oil) | Excellent Excellent Good | — |
| **Physical Properties of Compound Std. Test Specimens** Minimum Tensile Strength (psi) at 73°F | 7000 | D638 |
| **Thermal Expansion** (in/100ft/50°F Change) | 2" | — |
| **Fire Resistance** | Self Extinguishing | — |
| **Flame Spread** | 10 | E162 |
| **Smoke Development** | 330 | E84 |
| **Coefficient of Flow** Hazen & Williams | C=150 | — |
| **Mannings N Value** | N=0.009 | — |

# 04

# DIMENSIONS AND WEIGHTS

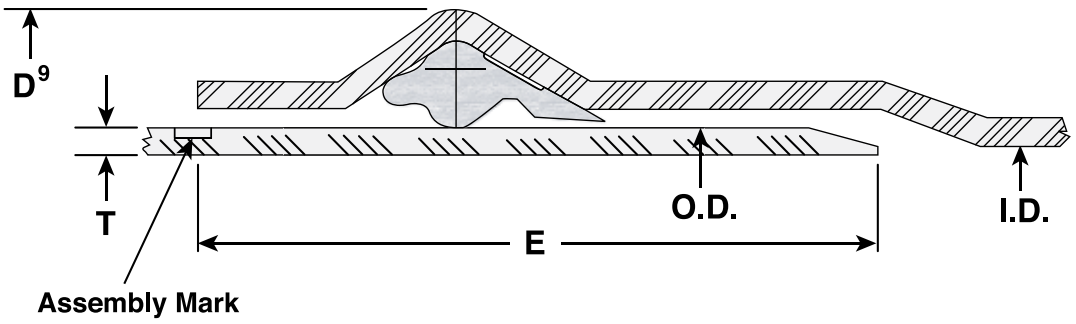
## SUBMITTAL AND DATA SHEET

| PIPE SIZE (IN) | AVERAGE O.D. (IN) | NOM. I.D. (IN) | MIN. T. (IN) | MIN. E (IN) | APPROX. D[9] (IN) | APPROX. WEIGHT (LBS/FT) |
|---|---|---|---|---|---|---|
| Rated 235 psi (DR 18) | | | | | | |
| 14 | 15.30 | 13.50 | 0.850 | 8.00 | 19.00 | 26.46 |
| 16 | 17.40 | 15.35 | 0.967 | 9.25 | 21.62 | 34.41 |
| 18 | 19.50 | 17.20 | 1.083 | 13.00 | 24.22 | 43.31 |
| 20 | 21.60 | 19.06 | 1.200 | 14.50 | 26.85 | 53.29 |
| 24 | 25.80 | 22.76 | 1.433 | 12.00 | 32.06 | 76.21 |
| Rated 200 psi (DR 21)* | | | | | | |
| 14 | 15.30 | 13.75 | 0.729 | 8.00 | 18.22 | 23.07 |
| 16 | 17.40 | 15.64 | 0.829 | 9.25 | 20.72 | 30.04 |
| 18 | 19.50 | 17.53 | 0.929 | 13.00 | 23.22 | 37.87 |
| 20 | 21.60 | 19.42 | 1.029 | 14.50 | 25.72 | 46.71 |
| 24 | 25.80 | 23.19 | 1.229 | 12.00 | 30.72 | 67.53 |
| 30 | 32.00 | 28.77 | 1.524 | 16.75 | 38.10 | 103.71 |
| 36 | 38.30 | 34.43 | 1.824 | 19.02 | 45.60 | 152.16 |
| Rated 165 psi (DR 25) | | | | | | |
| 14 | 15.30 | 14.00 | 0.612 | 8.00 | 17.94 | 19.32 |
| 16 | 17.40 | 15.92 | 0.696 | 9.25 | 20.41 | 25.17 |
| 18 | 19.50 | 17.85 | 0.780 | 13.00 | 22.87 | 31.61 |
| 20 | 21.60 | 19.77 | 0.864 | 14.50 | 25.34 | 38.89 |
| 24 | 25.80 | 23.61 | 1.032 | 12.00 | 30.27 | 55.80 |
| 30 | 32.00 | 29.29 | 1.280 | 16.75 | 37.12 | 87.78 |
| 36 | 38.30 | 35.05 | 1.532 | 19.02 | 44.43 | 128.41 |
| 42 | 44.50 | 40.73 | 1.780 | 22.43 | 51.62 | 176.02 |
| 48* | 50.80 | 46.49 | 2.032 | 24.78 | 58.93 | 231.22 |
| Rated 125 psi (DR 32.5)* | | | | | | |
| 14 | 15.30 | 14.30 | 0.471 | 8.00 | 17.48 | 15.14 |
| 16 | 17.40 | 16.27 | 0.535 | 9.25 | 19.88 | 19.63 |
| 18 | 19.50 | 18.23 | 0.600 | 13.00 | 23.30 | 24.75 |
| 20 | 21.60 | 20.19 | 0.665 | 14.50 | 24.38 | 30.54 |
| 24 | 25.80 | 24.12 | 0.794 | 12.00 | 29.47 | 44.11 |
| 30 | 32.00 | 29.91 | 0.985 | 16.75 | 35.94 | 68.45 |
| 36 | 38.30 | 35.80 | 1.178 | 19.02 | 43.01 | 99.22 |
| 42 | 44.50 | 41.60 | 1.369 | 22.43 | 49.98 | 135.49 |
| 48 | 50.80 | 47.49 | 1.563 | 24.78 | 56.73 | 178.49 |



| PIPE SIZE (IN) | AVERAGE O.D. (IN) | NOM. I.D. (IN) | MIN. T. (IN) | MIN. E (IN) | APPROX. D[9] (IN) | APPROX. WEIGHT (LBS/FT) |
|---|---|---|---|---|---|---|
| Rated 100 psi (DR 41) | | | | | | |
| 14 | 15.30 | 14.52 | 0.373 | 8.00 | 16.07 | 12.01 |
| 16 | 17.40 | 16.51 | 0.424 | 9.25 | 18.28 | 15.63 |
| 18 | 19.50 | 18.50 | 0.476 | 13.00 | 20.49 | 19.72 |
| 20 | 21.60 | 20.49 | 0.527 | 14.50 | 22.70 | 24.31 |
| 24 | 25.80 | 24.48 | 0.629 | 12.00 | 27.11 | 35.10 |
| 30 | 32.00 | 30.35 | 0.780 | 16.75 | 35.12 | 54.65 |
| 36 | 38.30 | 36.30 | 0.934 | 19.02 | 42.04 | 78.97 |
| 42 | 44.50 | 42.18 | 1.085 | 22.43 | 48.84 | 108.19 |
| 48 | 50.80 | 48.14 | 1.239 | 24.78 | 55.76 | 142.10 |
| Rated 80 psi (DR 51) | | | | | | |
| 30 | 32.00 | 30.67 | 0.627 | 16.75 | 34.50 | 44.08 |
| 36 | 38.30 | 36.71 | 0.751 | 19.02 | 41.30 | 64.32 |
| 42 | 44.50 | 42.65 | 0.872 | 22.43 | 47.99 | 88.10 |
| 48 | 50.80 | 48.69 | 0.996 | 24.78 | 54.78 | 115.79 |

* Prior to ordering or specifying, please consult JM Eagle™ for product and/or listing availablity.




I.D. : Inside Diameter

O.D. : Outside Diameter

T. : Wall Thickness

D9: Bell Outside Diameter

E: Distance between Assembly Mark to the end of spigot.

# 05

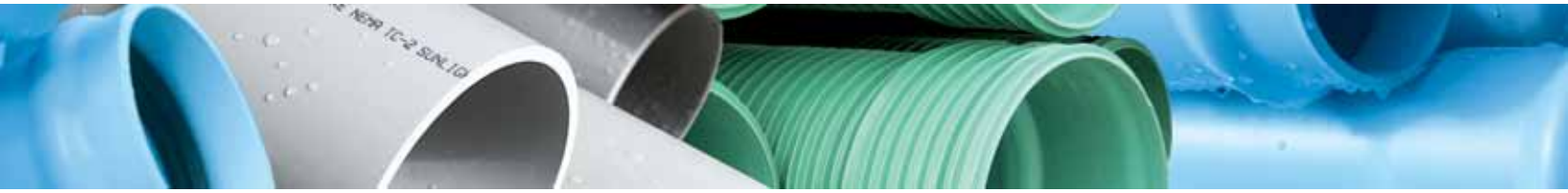
# FLOW/FRICTION CHARTS

## FLOW/FRICTION LOSS, BIG BLUE™ PVC PIPE

14" C.I.O.D. (AWWA C905) ACTUAL O.D. 15.300 INCH

| FLOW (GAL/ MIN) | DR 41 (100 psi) | | DR 32.5 (125 psi) | | DR 25 (165 psi) | | DR 21 (200 psi) | | DR 18 (235 psi) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT |
| 700 | 1.360 | 0.018 | 1.399 | 0.019 | 1.460 | 0.021 | 1.513 | 0.023 | 1.571 | 0.025 |
| 900 | 1.748 | 0.028 | 1.799 | 0.030 | 1.877 | 0.033 | 1.945 | 0.036 | 2.020 | 0.040 |
| 1100 | 2.136 | 0.041 | 2.199 | 0.044 | 2.294 | 0.048 | 2.377 | 0.053 | 2.468 | 0.058 |
| 1300 | 2.525 | 0.056 | 2.599 | 0.060 | 2.711 | 0.066 | 2.810 | 0.072 | 2.917 | 0.079 |
| 1500 | 2.913 | 0.072 | 2.999 | 0.078 | 3.128 | 0.086 | 3.242 | 0.094 | 3.366 | 0.103 |
| 1700 | 3.302 | 0.091 | 3.398 | 0.098 | 3.545 | 0.108 | 3.674 | 0.118 | 3.815 | 0.130 |
| 1900 | 3.690 | 0.112 | 3.798 | 0.120 | 3.962 | 0.133 | 4.106 | 0.145 | 4.264 | 0.159 |
| 2100 | 4.079 | 0.135 | 4.198 | 0.145 | 4.379 | 0.160 | 4.538 | 0.175 | 4.713 | 0.192 |
| 2300 | 4.467 | 0.160 | 4.598 | 0.171 | 4.796 | 0.190 | 4.971 | 0.207 | 5.161 | 0.227 |
| 2500 | 4.855 | 0.186 | 4.998 | 0.200 | 5.213 | 0.222 | 5.403 | 0.242 | 5.610 | 0.265 |
| 2700 | 5.244 | 0.215 | 5.397 | 0.231 | 5.630 | 0.256 | 5.835 | 0.279 | 6.059 | 0.306 |
| 2900 | 5.632 | 0.245 | 5.797 | 0.263 | 6.047 | 0.292 | 6.267 | 0.318 | 6.508 | 0.349 |
| 3000 | 5.827 | 0.261 | 5.997 | 0.280 | 6.256 | 0.311 | 6.483 | 0.339 | 6.732 | 0.371 |
| 3500 | 6.798 | 0.348 | 6.997 | 0.373 | 7.298 | 0.413 | 7.564 | 0.451 | 7.854 | 0.494 |
| 4000 | 7.769 | 0.445 | 7.996 | 0.478 | 8.341 | 0.529 | 8.645 | 0.577 | 8.976 | 0.633 |
| 4500 | 8.740 | 0.554 | 8.996 | 0.594 | 9.384 | 0.658 | 9.725 | 0.718 | 10.098 | 0.787 |
| 5000 | 9.711 | 0.673 | 9.995 | 0.722 | 10.426 | 0.800 | 10.806 | 0.873 | 11.220 | 0.956 |
| 5500 | 10.682 | 0.803 | 10.995 | 0.861 | 11.469 | 0.954 | 11.886 | 1.041 | 12.342 | 1.141 |

Based on calculation methods and design tables set forth by the Uni-Bell® PVC Pipe Association, “Handbook of PVC Pipe Design and Construction.”



## FLOW/FRICTION LOSS, BIG BLUE™ PVC PIPE

16" C.I.O.D. (AWWA C905) ACTUAL O.D. 17.400 INCH

| FLOW (GAL/ MIN) | DR 41 (100 psi) | | DR 32.5 (125 psi) | | DR 25 (165 psi) | | DR 21 (200 psi) | | DR 18 (235 psi) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT |
| 900 | 1.351 | 0.015 | 1.391 | 0.016 | 1.451 | 0.018 | 1.504 | 0.019 | 1.562 | 0.021 |
| 1200 | 1.802 | 0.026 | 1.854 | 0.027 | 1.935 | 0.030 | 2.005 | 0.033 | 2.082 | 0.036 |
| 1500 | 2.252 | 0.039 | 2.318 | 0.042 | 2.418 | 0.046 | 2.506 | 0.050 | 2.603 | 0.055 |
| 1800 | 2.703 | 0.054 | 2.782 | 0.058 | 2.902 | 0.065 | 3.008 | 0.070 | 3.123 | 0.077 |
| 2100 | 3.153 | 0.072 | 3.245 | 0.077 | 3.386 | 0.086 | 3.509 | 0.094 | 3.644 | 0.103 |
| 2400 | 3.604 | 0.092 | 3.709 | 0.099 | 3.870 | 0.110 | 4.010 | 0.120 | 4.165 | 0.131 |
| 2700 | 4.054 | 0.115 | 4.172 | 0.123 | 4.353 | 0.137 | 4.512 | 0.149 | 4.685 | 0.163 |
| 3000 | 4.505 | 0.140 | 4.636 | 0.150 | 4.837 | 0.166 | 5.013 | 0.181 | 5.206 | 0.199 |
| 3300 | 4.955 | 0.167 | 5.100 | 0.179 | 5.321 | 0.198 | 5.514 | 0.216 | 5.726 | 0.237 |
| 3500 | 5.256 | 0.186 | 5.409 | 0.199 | 5.643 | 0.221 | 5.848 | 0.241 | 6.073 | 0.264 |
| 4000 | 6.006 | 0.238 | 6.181 | 0.255 | 6.449 | 0.283 | 6.684 | 0.309 | 6.941 | 0.338 |
| 4500 | 6.757 | 0.296 | 6.954 | 0.318 | 7.255 | 0.352 | 7.519 | 0.384 | 7.809 | 0.421 |
| 5000 | 7.508 | 0.360 | 7.727 | 0.386 | 8.062 | 0.428 | 8.355 | 0.467 | 8.676 | 0.512 |
| 5500 | 8.259 | 0.429 | 8.499 | 0.460 | 8.868 | 0.510 | 9.190 | 0.557 | 9.544 | 0.610 |
| 6000 | 9.010 | 0.504 | 9.272 | 0.541 | 9.674 | 0.600 | 10.026 | 0.654 | 10.412 | 0.717 |
| 6500 | 9.760 | 0.585 | 10.045 | 0.627 | 10.480 | 0.696 | 10.861 | 0.759 | 11.279 | 0.832 |
| 7000 | 10.511 | 0.671 | 10.817 | 0.720 | 11.286 | 0.798 | 11.697 | 0.870 | 12.147 | 0.954 |
| 7500 | 11.262 | 0.763 | 11.590 | 0.818 | 12.092 | 0.907 | 12.532 | 0.989 | 13.014 | 1.084 |

Based on calculation methods and design tables set forth by the Uni-Bell® PVC Pipe Association, “Handbook of PVC Pipe Design and Construction.”

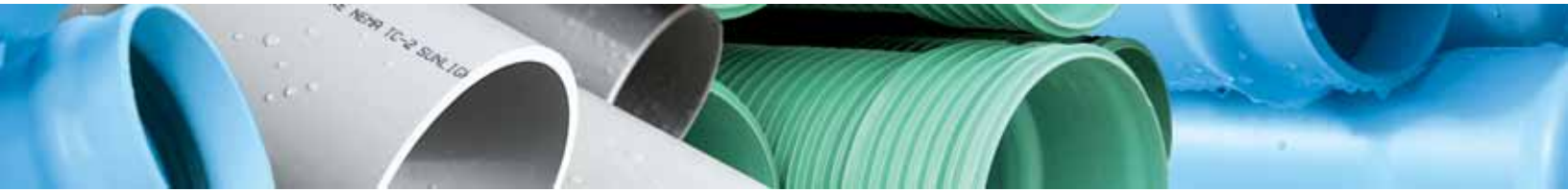
# FLOW/FRICTION CHARTS
(CONTINUED)

## FLOW/FRICTION LOSS, BIG BLUE™ PVC PIPE

18" C.I.O.D. (AWWA C905) ACTUAL O.D. 19.500 INCH

| FLOW (GAL/ MIN) | DR 51 (80 psi) | | DR 41 (100 psi) | | DR 32.5 (125 psi) | | DR 25 (165 psi) | | DR 21 (200 psi) | | DR 18 (200 psi) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT |
| 1100 | 1.287 | 0.012 | 1.315 | 0.013 | 1.354 | 0.013 | 1.412 | 0.015 | 1.463 | 0.016 | 1.520 | 0.018 |
| 1400 | 1.639 | 0.019 | 1.674 | 0.020 | 1.723 | 0.021 | 1.797 | 0.023 | 1.863 | 0.025 | 1.934 | 0.028 |
| 1700 | 1.990 | 0.027 | 2.033 | 0.028 | 2.092 | 0.030 | 2.182 | 0.033 | 2.262 | 0.036 | 2.348 | 0.040 |
| 2000 | 2.341 | 0.036 | 2.392 | 0.038 | 2.461 | 0.041 | 2.567 | 0.045 | 2.661 | 0.049 | 2.763 | 0.054 |
| 2300 | 2.692 | 0.047 | 2.750 | 0.049 | 2.830 | 0.053 | 2.953 | 0.058 | 3.060 | 0.064 | 3.177 | 0.070 |
| 2600 | 3.043 | 0.058 | 3.109 | 0.062 | 3.199 | 0.066 | 3.338 | 0.073 | 3.459 | 0.080 | 3.592 | 0.088 |
| 2900 | 3.394 | 0.072 | 3.468 | 0.075 | 3.569 | 0.081 | 3.723 | 0.090 | 3.858 | 0.098 | 4.006 | 0.107 |
| 3200 | 3.745 | 0.086 | 3.827 | 0.090 | 3.938 | 0.097 | 4.108 | 0.108 | 4.257 | 0.117 | 4.420 | 0.129 |
| 3500 | 4.097 | 0.101 | 4.185 | 0.107 | 4.307 | 0.115 | 4.493 | 0.127 | 4.656 | 0.138 | 4.835 | 0.152 |
| 4000 | 4.682 | 0.130 | 4.783 | 0.137 | 4.922 | 0.147 | 5.135 | 0.163 | 5.322 | 0.177 | 5.526 | 0.194 |
| 4500 | 5.267 | 0.162 | 5.381 | 0.170 | 5.537 | 0.182 | 5.777 | 0.202 | 5.987 | 0.221 | 6.216 | 0.242 |
| 5000 | 5.852 | 0.196 | 5.979 | 0.207 | 6.153 | 0.222 | 6.419 | 0.246 | 6.625 | 0.268 | 6.907 | 0.294 |
| 5500 | 6.437 | 0.234 | 6.577 | 0.247 | 6.768 | 0.265 | 7.061 | 0.293 | 7.317 | 0.320 | 7.598 | 0.350 |
| 6000 | 7.023 | 0.275 | 7.175 | 0.290 | 7.383 | 0.311 | 7.702 | 0.345 | 7.983 | 0.376 | 8.288 | 0.412 |
| 6500 | 7.608 | 0.319 | 7.773 | 0.336 | 7.999 | 0.360 | 8.344 | 0.400 | 8.648 | 0.436 | 8.979 | 0.478 |
| 7000 | 8.193 | 0.366 | 8.371 | 0.386 | 8.614 | 0.414 | 8.986 | 0.458 | 9.313 | 0.500 | 9.670 | 0.548 |
| 7500 | 8.778 | 0.416 | 8.969 | 0.438 | 9.229 | 0.470 | 9.628 | 0.521 | 9.978 | 0.568 | 10.360 | 0.622 |
| 8000 | 9.364 | 0.469 | 9.566 | 0.494 | 9.844 | 0.530 | 10.270 | 0.587 | 10.643 | 0.640 | 11.051 | 0.702 |

Based on calculation methods and design tables set forth by the Uni-Bell® PVC Pipe Association, “Handbook of PVC Pipe Design and Construction.”



## FLOW/FRICTION LOSS, BIG BLUE™ PVC PIPE

20" C.I.O.D. (AWWA C905) ACTUAL O.D. 21.600 INCH

| FLOW (GAL/ MIN) | DR 51 (80 psi) | | DR 41 (100 psi) | | DR 32.5 (125 psi) | | DR 25 (165 psi) | | DR 18 (235 psi) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT |
| 1500 | 1.431 | 0.013 | 1.462 | 0.014 | 1.504 | 0.015 | 1.465 | 0.014 | 1.576 | 0.017 |
| 2000 | 1.908 | 0.022 | 1.949 | 0.023 | 2.006 | 0.025 | 1.988 | 0.025 | 2.139 | 0.030 |
| 2500 | 2.385 | 0.033 | 2.436 | 0.035 | 2.507 | 0.037 | 2.511 | 0.038 | 2.702 | 0.046 |
| 3000 | 2.862 | 0.046 | 2.924 | 0.049 | 3.009 | 0.052 | 3.034 | 0.054 | 3.265 | 0.065 |
| 3500 | 3.339 | 0.062 | 3.411 | 0.065 | 3.510 | 0.070 | 3.557 | 0.073 | 3.828 | 0.087 |
| 4000 | 3.816 | 0.079 | 3.898 | 0.083 | 4.012 | 0.089 | 4.080 | 0.094 | 4.391 | 0.113 |
| 4500 | 4.293 | 0.098 | 4.385 | 0.103 | 4.513 | 0.111 | 4.604 | 0.118 | 4.954 | 0.141 |
| 5000 | 4.770 | 0.119 | 4.873 | 0.126 | 5.015 | 0.135 | 5.127 | 0.144 | 5.517 | 0.172 |
| 5500 | 5.248 | 0.142 | 5.360 | 0.150 | 5.516 | 0.161 | 5.650 | 0.172 | 6.080 | 0.206 |
| 6000 | 5.725 | 0.167 | 5.847 | 0.176 | 6.018 | 0.189 | 6.278 | 0.209 | 6.756 | 0.250 |
| 7000 | 6.679 | 0.223 | 6.822 | 0.234 | 7.021 | 0.251 | 7.324 | 0.279 | 7.882 | 0.333 |
| 8000 | 7.633 | 0.285 | 7.796 | 0.300 | 8.024 | 0.322 | 8.370 | 0.357 | 9.007 | 0.427 |
| 9000 | 8.587 | 0.355 | 8.771 | 0.373 | 9.027 | 0.400 | 9.416 | 0.444 | 10.133 | 0.531 |
| 10000 | 9.541 | 0.431 | 9.745 | 0.454 | 10.030 | 0.487 | 10.463 | 0.539 | 11.259 | 0.645 |
| 11000 | 10.495 | 0.514 | 10.720 | 0.541 | 11.033 | 0.581 | 11.509 | 0.644 | 12.385 | 0.769 |
| 12000 | 11.449 | 0.604 | 11.695 | 0.636 | 12.036 | 0.682 | 12.555 | 0.756 | 13.511 | 0.904 |
| 13000 | 12.403 | 0.701 | 12.669 | 0.738 | 13.039 | 0.791 | 13.601 | 0.877 | 14.637 | 1.048 |
| 14000 | 13.357 | 0.804 | 13.644 | 0.846 | 14.042 | 0.908 | 14.648 | 1.006 | 15.763 | 1.203 |

Based on calculation methods and design tables set forth by the Uni-Bell® PVC Pipe Association, “Handbook of PVC Pipe Design and Construction.”

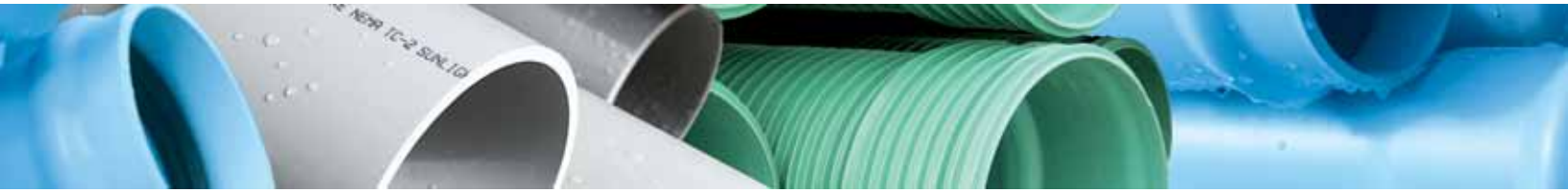
# FLOW/FRICTION CHARTS
(CONTINUED)

## FLOW/FRICTION LOSS, BIG BLUE™ PVC PIPE

24" C.I.O.D. (AWWA C905) ACTUAL O.D. 25.800 INCH

| FLOW (GAL/ MIN) | DR 51 (80 psi) | | DR 41 (100 psi) | | DR 32.5 (125 psi) | | DR 25 (165 psi) | | DR 18 (235 psi) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT |
| 2000 | 1.337 | 0.009 | 1.366 | 0.010 | 1.406 | 0.010 | 1.467 | 0.012 | 1.578 | 0.014 |
| 2500 | 1.672 | 0.014 | 1.708 | 0.015 | 1.757 | 0.016 | 1.833 | 0.017 | 1.973 | 0.021 |
| 3000 | 2.006 | 0.020 | 2.049 | 0.021 | 2.109 | 0.022 | 2.200 | 0.024 | 2.367 | 0.029 |
| 3500 | 2.340 | 0.026 | 2.391 | 0.027 | 2.460 | 0.029 | 2.567 | 0.033 | 2.762 | 0.039 |
| 4000 | 2.675 | 0.033 | 2.732 | 0.035 | 2.812 | 0.038 | 2.933 | 0.042 | 3.157 | 0.050 |
| 4500 | 3.009 | 0.041 | 3.074 | 0.044 | 3.163 | 0.047 | 3.300 | 0.052 | 3.551 | 0.062 |
| 5000 | 3.343 | 0.050 | 3.415 | 0.053 | 3.515 | 0.057 | 3.667 | 0.063 | 3.946 | 0.075 |
| 5500 | 3.678 | 0.060 | 3.757 | 0.063 | 3.866 | 0.068 | 4.033 | 0.075 | 4.340 | 0.090 |
| 6000 | 4.012 | 0.070 | 4.098 | 0.074 | 4.218 | 0.080 | 4.400 | 0.088 | 4.735 | 0.105 |
| 6500 | 4.346 | 0.082 | 4.440 | 0.086 | 4.569 | 0.092 | 4.767 | 0.102 | 5.129 | 0.122 |
| 7500 | 5.015 | 0.107 | 5.123 | 0.112 | 5.272 | 0.120 | 5.500 | 0.133 | 5.919 | 0.159 |
| 8500 | 5.684 | 0.134 | 5.806 | 0.141 | 5.975 | 0.152 | 6.233 | 0.168 | 6.708 | 0.201 |
| 9500 | 6.353 | 0.165 | 6.489 | 0.174 | 6.678 | 0.186 | 6.967 | 0.207 | 7.497 | 0.247 |
| 10500 | 7.021 | 0.199 | 7.172 | 0.209 | 7.381 | 0.224 | 7.700 | 0.249 | 8.286 | 0.297 |
| 11500 | 7.690 | 0.235 | 7.855 | 0.248 | 8.084 | 0.266 | 8.433 | 0.294 | 9.075 | 0.352 |
| 12500 | 8.359 | 0.274 | 8.538 | 0.289 | 8.787 | 0.310 | 9.167 | 0.344 | 9.864 | 0.411 |
| 13500 | 9.027 | 0.316 | 9.221 | 0.333 | 9.490 | 0.357 | 9.900 | 0.396 | 10.653 | 0.474 |
| 14500 | 9.696 | 0.361 | 9.904 | 0.380 | 10.193 | 0.408 | 10.633 | 0.452 | 11.443 | 0.541 |

Based on calculation methods and design tables set forth by the Uni-Bell® PVC Pipe Association, “Handbook of PVC Pipe Design and Construction.”



## FLOW/FRICTION LOSS, BIG BLUE™ PVC PIPE

30" C.I.O.D. (AWWA C905) ACTUAL O.D. 32.000 INCH

| FLOW (GAL/MIN) | DR 51 (80 psi) | | DR 41 (100 psi) | | DR 32.5 (125 psi) | | DR 25 (165 psi) | |
|---|---|---|---|---|---|---|---|---|
| | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT |
| 3000 | 1.304 | 0.007 | 1.332 | 0.007 | 1.371 | 0.008 | 1.430 | 0.009 |
| 3500 | 1.521 | 0.009 | 1.554 | 0.010 | 1.599 | 0.010 | 1.668 | 0.011 |
| 4000 | 1.739 | 0.012 | 1.776 | 0.012 | 1.828 | 0.013 | 1.907 | 0.015 |
| 4500 | 1.956 | 0.015 | 1.998 | 0.015 | 2.056 | 0.016 | 2.145 | 0.018 |
| 5000 | 2.173 | 0.018 | 2.220 | 0.019 | 2.285 | 0.020 | 2.384 | 0.022 |
| 5500 | 2.391 | 0.021 | 2.442 | 0.022 | 2.513 | 0.024 | 2.622 | 0.026 |
| 6000 | 2.608 | 0.025 | 2.664 | 0.026 | 2.742 | 0.028 | 2.860 | 0.031 |
| 6500 | 2.825 | 0.029 | 2.886 | 0.030 | 2.970 | 0.032 | 3.099 | 0.036 |
| 7000 | 3.042 | 0.033 | 3.108 | 0.035 | 3.199 | 0.037 | 3.337 | 0.041 |
| 8000 | 3.477 | 0.042 | 3.552 | 0.044 | 3.656 | 0.048 | 3.814 | 0.053 |
| 10000 | 4.346 | 0.064 | 4.440 | 0.067 | 4.570 | 0.072 | 4.767 | 0.080 |
| 12000 | 5.216 | 0.089 | 5.328 | 0.094 | 5.484 | 0.101 | 5.720 | 0.112 |
| 14000 | 6.085 | 0.119 | 6.216 | 0.125 | 6.398 | 0.134 | 6.674 | 0.149 |
| 16000 | 6.954 | 0.152 | 7.104 | 0.160 | 7.312 | 0.172 | 7.627 | 0.190 |
| 18000 | 7.823 | 0.189 | 7.992 | 0.199 | 8.226 | 0.214 | 8.581 | 0.237 |
| 20000 | 8.693 | 0.230 | 8.880 | 0.242 | 9.139 | 0.260 | 9.534 | 0.288 |
| 22000 | 9.562 | 0.274 | 9.768 | 0.289 | 10.053 | 0.310 | 10.487 | 0.343 |
| 24000 | 10.431 | 0.322 | 10.656 | 0.339 | 10.967 | 0.364 | 11.441 | 0.403 |

Based on calculation methods and design tables set forth by the Uni-Bell® PVC Pipe Association, “Handbook of PVC Pipe Design and Construction.”

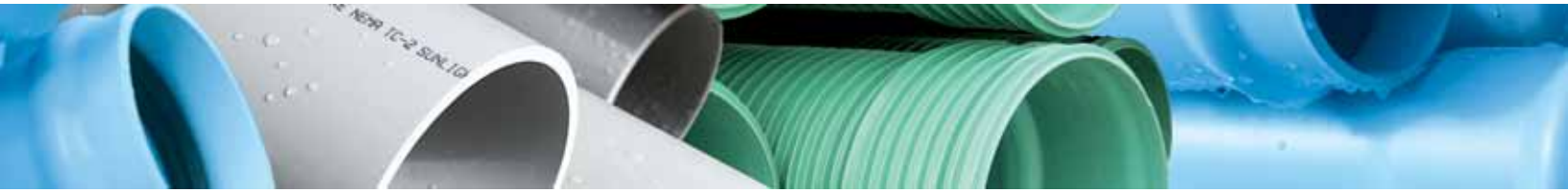
# FLOW/FRICTION CHARTS
(CONTINUED)

## FLOW/FRICTION LOSS, BIG BLUE™ PVC PIPE

36" C.I.O.D. (AWWA C905) ACTUAL O.D. 38.300 INCH

| FLOW (GAL/MIN) | DR 51 (80 psi) | | DR 41 (100 psi) | | DR 32.5 (125 psi) | | DR 25 (165 psi) | |
|---|---|---|---|---|---|---|---|---|
| | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT |
| 5000 | 1.517 | 0.007 | 1.550 | 0.008 | 1.595 | 0.008 | 1.664 | 0.009 |
| 5500 | 1.669 | 0.009 | 1.705 | 0.009 | 1.754 | 0.010 | 1.830 | 0.011 |
| 6000 | 1.821 | 0.010 | 1.860 | 0.011 | 1.914 | 0.012 | 1.997 | 0.013 |
| 6500 | 1.972 | 0.012 | 2.015 | 0.013 | 2.073 | 0.014 | 2.163 | 0.015 |
| 7000 | 2.124 | 0.014 | 2.170 | 0.014 | 2.223 | 0.015 | 2.329 | 0.017 |
| 8000 | 2.427 | 0.018 | 2.480 | 0.018 | 2.552 | 0.020 | 2.662 | 0.022 |
| 11000 | 3.338 | 0.032 | 3.409 | 0.033 | 3.509 | 0.036 | 3.661 | 0.040 |
| 14000 | 4.248 | 0.050 | 4.339 | 0.052 | 4.466 | 0.056 | 4.659 | 0.062 |
| 17000 | 5.158 | 0.071 | 5.269 | 0.075 | 5.422 | 0.080 | 5.657 | 0.089 |
| 20000 | 6.069 | 0.096 | 6.199 | 0.101 | 6.379 | 0.108 | 6.655 | 0.120 |
| 23000 | 6.979 | 0.124 | 7.129 | 0.131 | 7.336 | 0.140 | 7.654 | 0.155 |
| 26000 | 7.889 | 0.156 | 8.059 | 0.164 | 8.293 | 0.176 | 8.652 | 0.195 |
| 29000 | 8.799 | 0.191 | 8.988 | 0.201 | 9.250 | 0.215 | 9.650 | 0.239 |
| 32000 | 9.710 | 0.229 | 9.918 | 0.241 | 10.207 | 0.258 | 10.649 | 0.287 |
| 35000 | 10.620 | 0.270 | 10.848 | 0.285 | 11.164 | 0.305 | 11.647 | 0.338 |
| 38000 | 11.530 | 0.315 | 11.778 | 0.331 | 12.121 | 0.355 | 12.645 | 0.394 |
| 41000 | 12.441 | 0.362 | 12.708 | 0.381 | 13.078 | 0.409 | 13.644 | 0.453 |
| 44000 | 13.351 | 0.413 | 13.638 | 0.435 | 14.0352 | 0.466 | 14.642 | 0.517 |

Based on calculation methods and design tables set forth by the Uni-Bell® PVC Pipe Association, “Handbook of PVC Pipe Design and Construction.”



## FLOW/FRICTION LOSS, BIG BLUE™ PVC PIPE

42" C.I.O.D. (AWWA C905) ACTUAL O.D. 44.500 INCH

| FLOW (GAL/MIN) | DR 51 (80 psi) | | DR 41 (100 psi) | | DR 32.5 (125 psi) | | DR 25 (165 psi) | |
|---|---|---|---|---|---|---|---|---|
| | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT |
| 7000 | 1.573 | 0.007 | 1.607 | 0.007 | 1.654 | 0.007 | 1.726 | 0.008 |
| 7500 | 1.686 | 0.008 | 1.722 | 0.008 | 1.772 | 0.008 | 1.849 | 0.009 |
| 8000 | 1.798 | 0.008 | 1.837 | 0.009 | 1.890 | 0.010 | 1.972 | 0.011 |
| 8500 | 1.910 | 0.009 | 1.952 | 0.010 | 2.008 | 0.011 | 2.095 | 0.012 |
| 9000 | 2.023 | 0.011 | 2.066 | 0.011 | 2.127 | 0.012 | 2.219 | 0.013 |
| 9500 | 2.135 | 0.012 | 2.181 | 0.012 | 2.245 | 0.013 | 2.342 | 0.015 |
| 10000 | 2.248 | 0.013 | 2.296 | 0.013 | 2.363 | 0.014 | 2.465 | 0.016 |
| 14000 | 3.147 | 0.024 | 3.214 | 0.025 | 3.308 | 0.027 | 3.451 | 0.030 |
| 18000 | 4.046 | 0.038 | 4.133 | 0.040 | 4.253 | 0.043 | 4.437 | 0.048 |
| 22000 | 4.945 | 0.055 | 5.051 | 0.058 | 5.198 | 0.062 | 5.423 | 0.069 |
| 26000 | 5.844 | 0.075 | 5.969 | 0.079 | 6.143 | 0.085 | 6.409 | 0.094 |
| 30000 | 6.743 | 0.098 | 6.888 | 0.103 | 7.089 | 0.111 | 7.395 | 0.123 |
| 34000 | 7.642 | 0.123 | 7.806 | 0.130 | 8.034 | 0.139 | 8.381 | 0.155 |
| 38000 | 8.541 | 0.152 | 8.724 | 0.160 | 8.979 | 0.171 | 9.367 | 0.190 |
| 42000 | 9.440 | 0.183 | 9.643 | 0.192 | 9.924 | 0.206 | 10.353 | 0.229 |
| 46000 | 10.339 | 0.216 | 10.561 | 0.227 | 10.869 | 0.244 | 11.339 | 0.270 |
| 50000 | 11.238 | 0.252 | 11.480 | 0.265 | 11.814 | 0.285 | 12.325 | 0.316 |
| 54000 | 12.137 | 0.291 | 12.398 | 0.306 | 12.759 | 0.328 | 13.311 | 0.364 |

Based on calculation methods and design tables set forth by the Uni-Bell® PVC Pipe Association, “Handbook of PVC Pipe Design and Construction.”

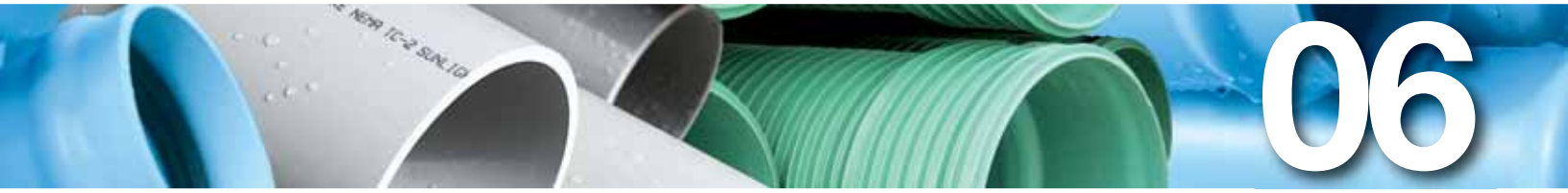
# FLOW/FRICTION CHARTS
(CONTINUED)

## FLOW/FRICTION LOSS, BIG BLUE™ PVC PIPE

48" C.I.O.D. (AWWA C905) ACTUAL O.D. 50.80 INCH

| FLOW (GAL/MIN) | DR 51 (80 psi) | | DR 41 (100 psi) | | DR 32.5 (125 psi) | |
|---|---|---|---|---|---|---|
| | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT | VELOCITY FT/S | PRESSURE DROP psi/100 FT |
| 9000 | 1.552 | 0.006 | 1.586 | 0.006 | 1.632 | 0.006 |
| 9500 | 1.639 | 0.006 | 1.674 | 0.006 | 1.723 | 0.007 |
| 10000 | 1.725 | 0.007 | 1.762 | 0.007 | 1.813 | 0.008 |
| 14000 | 2.415 | 0.013 | 2.467 | 0.013 | 2.538 | 0.014 |
| 18000 | 3.105 | 0.020 | 3.171 | 0.021 | 3.264 | 0.023 |
| 22000 | 3.794 | 0.029 | 3.876 | 0.030 | 3.989 | 0.033 |
| 26000 | 4.484 | 0.039 | 4.581 | 0.042 | 4.714 | 0.045 |
| 30000 | 5.174 | 0.051 | 5.285 | 0.054 | 5.440 | 0.058 |
| 34000 | 5.864 | 0.065 | 5.990 | 0.068 | 6.165 | 0.073 |
| 38000 | 6.554 | 0.080 | 6.695 | 0.084 | 6.890 | 0.090 |
| 42000 | 7.244 | 0.096 | 7.400 | 0.101 | 7.615 | 0.108 |
| 46000 | 7.934 | 0.113 | 8.104 | 0.119 | 8.341 | 0.128 |
| 50000 | 8.624 | 0.132 | 8.809 | 0.139 | 9.066 | 0.149 |
| 54000 | 9.314 | 0.153 | 9.514 | 0.161 | 9.791 | 0.172 |
| 58000 | 10.004 | 0.174 | 10.219 | 0.184 | 10.516 | 0.197 |
| 62000 | 10.693 | 0.197 | 10.923 | 0.208 | 11.242 | 0.223 |
| 66000 | 11.383 | 0.221 | 11.628 | 0.233 | 11.967 | 0.250 |
| 70000 | 12.073 | 0.247 | 12.333 | 0.260 | 12.6921 | 0.279 |

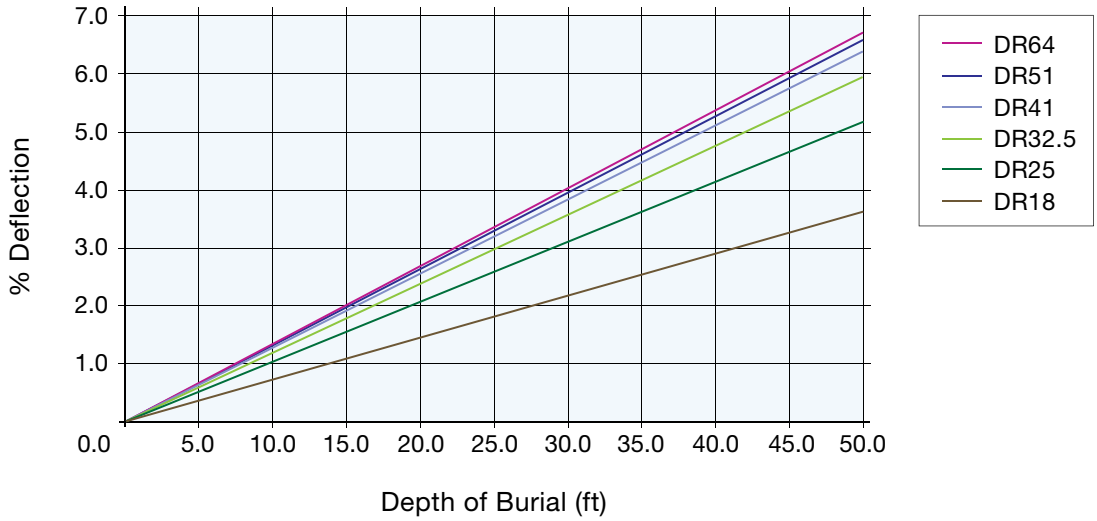
Based on calculation methods and design tables set forth by the Uni-Bell® PVC Pipe Association, “Handbook of PVC Pipe Design and Construction.”



# 06

# DEFLECTION CHART

## BIG BLUE™ DEFLECTION BY DEPTH OF BURIAL : : †




: : Deflections computed using a unit weight of backfill at 120 lbs/cft and assume no internal pressure or live load.

: : Pipe embedment used in calculations is Class 1, 2, 3, or 4, as defined in ASTM D2321 with appropriate compaction to achieve an E'=1000 psi.

† Based on calculation methods and design tables set forth by the Uni-Bell® PVC Pipe Association, “Handbook of PVC Pipe Design and Construction.”

# 07

# SHORT FORM INSTALLATION GUIDE/ WARNING

*This information is furnished in order to provide a brief review of the installation requirements for JM Eagle™ Big Blue™ PVC pipe. It is not intended to serve as or replace the function of the FULL VERSION product installation guide available upon request.*

1. Check to see that the gasket is properly seated in the bell groove, and that the bell and spigot are clean before assembly.
2. Apply the approved lubricant supplied with the pipe to the spigot end of the pipe, paying particular attention to the bevel. The coating should be equivalent to a brush coat of enamel paint.
3. Assemble the joint only to and not over the assembly mark provided on the spigot end.
4. If undue resistance to insertion of the spigot is encountered, or the assembly mark does not reach the flush position, disassemble the joint and check the position of the rubber gasket, and remove any debris.
5. JM Eagle's recommendation for 14" through 48" diameter **Big Blue™ Only** is that the angular deflection at the joint is a maximum of 1.5 degrees. This will produce an offset in a 20' section of approximately 6¼ inches. Joint deflection is achieved after the joint is assembled in straight alignment and to the reference mark.
6. Prior to backfilling, check to see that the assembly mark is flush with the end of the bell.
7. All taps performed on JM Eagle's pressure products, shall be in accordance with Uni-Bell® Publication UNI-PUB-08-07, "Tapping Guide for PVC Pressure Pipe."

## ⚠ WARNING: RUPTURE HAZARD

**IMPROPER INSTALLATION OR MISUSE OF TAPPING TOOLS MAY CAUSE PIPES UNDER HIGH PRESSURE TO RUPTURE AND RESULT IN HIGH VELOCITY AIRBORNE FRAGMENTATION LEADING TO SERIOUS INJURIES AND/OR DEATH.**

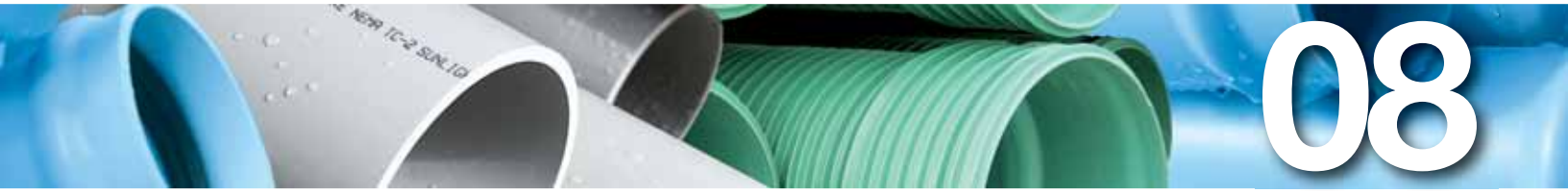
**BEFORE AND DURING INSTALLATION, ALWAYS:**

- Consult and follow the FULL VERSION of the product installation guide
- Closely follow job specifications
- Use protective gear and equipment

**BEFORE AND DURING TAPPING, ALWAYS:**

- Consult and follow Uni-Bell® Publication UNI-PUB-08-07, "Tapping Guide for PVC Pressure Pipe."
- Use the correct tapping tools
- Bleed air from pipes at high spot before tapping
- Use protective gear and equipment

Please contact JM Eagle™ Product Assurance at (800) 621-4404 to obtain FULL VERSION of the appropriate installation guide or for further assistance.



08

# WARRANTY

**JM EAGLE™ PRODUCTS LIMITED WARRANTY**

J-M Manufacturing Co., Inc. (JM Eagle™) warrants that its standard polyvinyl chloride (PVC), polyethylene (PE), conduit/plumbing/solvent weld and Acrylonitrile-Butadiene-Styrene (ABS) pipe Products ("Products") are manufactured in accordance with applicable industry specifications referenced on the Product and are free from defects in workmanship and materials. Every claim under this warranty shall be void unless in writing and received by JM Eagle™ within thirty (30) days of the date the defect was discovered, and within one (1) year of the date of shipment from the JM Eagle™ plant. Claims for Product appearance defects, such as sun-bleached pipe etc., however, must be made within thirty (30) days of the date of the shipment from the JM Eagle™ plant. This warranty specifically excludes any Products allowed to become sun-bleached after shipment from the JM Eagle™ plant. Proof of purchase with the date thereof must be presented to the satisfaction of JM Eagle™, with any claim made pursuant to this warranty. JM Eagle™ must first be given an opportunity to inspect the alleged defective Products in order to determine if it meets applicable industry standards, if the handling and installation have been satisfactorily performed in accordance with JM Eagle™ recommended practices and if operating conditions are within standards. Written permission and/or a Return Goods Authorization (RGA) must be obtained along with instructions for return shipment to JM Eagle™ of any Products claimed to be defective.

The limited and exclusive remedy for breach of this Limited Warranty shall be, at JM Eagle's sole discretion, the replacement of the same type, size and like quantity of non-defective Product, or credits, offsets, or combination of thereof, for the wholesale purchase price of the defective unit.

This Limited Warranty does not apply for any Product failures caused by user's flawed designs or specifications, unsatisfactory applications, improper installations, use in conjunction with incompatible materials, contact with aggressive chemical agents, freezing or overheating of liquids in the product and any other misuse causes not listed here. This Limited Warranty also excludes failure or damage caused by fire stopping materials, thread sealants, plasticized vinyl Products or damage caused by the fault or negligence of anyone other than JM Eagle™, or any other act or event beyond the control of JM Eagle™.

JM Eagle's liability shall not, at any time, exceed the actual wholesale purchase price of the Product. The warranties in this document are the only warranties applicable to the Product and there are no other warranties, expressed or implied. This Limited Warranty specifically excludes any liability for general damages, consequential or incidental damages, including without limitation, costs incurred from removal, reinstallation, or other expenses resulting from any defect. IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE SPECIFICALLY DISCLAIMED AND JM EAGLE™ SHALL NOT BE LIABLE IN THIS RESPECT NOTWITHSTANDING JM EAGLE'S ACTUAL KNOWLEDGE THE PRODUCT'S INTENDED USE.

JM Eagle's Products should be used in accordance with standards set forth by local plumbing and building laws, codes, or regulations and the applicable standards. Failure to adhere to these standards shall void this Limited Warranty. Products sold by JM Eagle™ that are manufactured by others are warranted only to the extent and limits of the warranty of the manufacturer. No statement, conduct or description by JM Eagle™ or its representative, in addition to or beyond this Limited Warranty, shall constitute a warranty. This Limited Warranty may only be modified in writing signed by an officer of JM Eagle™.

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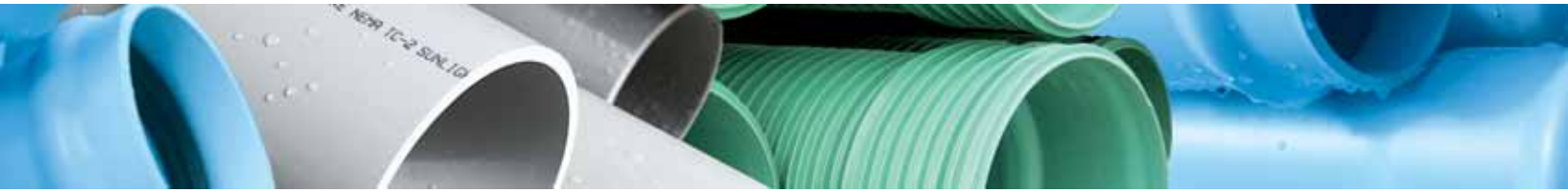

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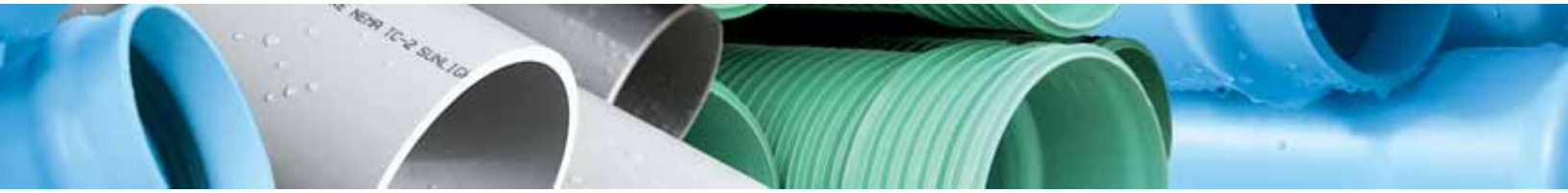

# PLANT LOCATIONS

**ADEL**
2101 J-M Drive
Adel, Georgia 31620

**BATCHELOR**
2894 Marion Monk Road
Batchelor, Louisiana 70715

**BUCKHANNON**
Old Drop 33, Mudlick Road
Buckhannon, West Virginia 26201

**BUTNER**
2602 West Lyon Station Road
Creedmoor, North Carolina 27522

**CAMERON PARK**
3500 Robin Lane
Cameron Park, California 95682

**COLUMBIA**
6500 North Brown Station Road
Columbia, Missouri 65202

**CONROE**
101 East Avenue M
Conroe, Texas 77301

**FONTANA**
10990 Hemlock Avenue
Fontana, California 92337

**HASTINGS**
146 North Maple Avenue
Hastings, Nebraska 68901

**KINGMAN**
4620 Olympic Way
Kingman, Arizona 86401

**MAGNOLIA**
2220 Duracrete Drive
Magnolia, Arkansas 71753

**MCNARY**
31240 Roxbury Road
Umatilla, Oregon 97882

**MEADVILLE**
15661 Delano Road
Cochranton, Pennsylvania 16314

**PERRIS**
23711 Rider Street
Perris, California 92570

**PUEBLO**
1742 E. Platteville Boulevard
Pueblo West, Colorado 81007

**STOCKTON**
1051 Sperry Road
Stockton, California 95206

**SUNNYSIDE**
1820 South First Street
Sunnyside, Washington 98944

**TACOMA**
2330 Port of Tacoma Road
Tacoma, Washington 98421

**TULSA**
4501 West 49th Street
Tulsa, Oklahoma 74107

**VISALIA**
8875 Avenue 304
Visalia, California 93291

**WHARTON**
10807 US 59 RD
Wharton, Texas 77488

**WILTON**
1314 W. Third Street
Wilton, Iowa 52778

**MEXICO**
PLASTICS TECHNOLOGY
DE MÉXICO S DE R.L. DE S.A.
Av. Montes Urales No. 8 y 10
Parque Industrial Opción, Carretera
57 Qro. -S.L.P. Km. 57.8
C.P. 37980 San José Iturbide,
Guanajuato México

** Our Mexico location is a joint venture between JM Eagle™ and Plastics Technology*

**GLOBAL HEADQUARTERS**
5200 West Century Boulevard
Los Angeles, California 90045

**REGIONAL OFFICE**
Nine Peach Tree Hill Road
Livingston, New Jersey 07039

**J-M Manufacturing Co., Inc. and PW Eagle, Inc. are doing business as JM Eagle™.**

# JM Eagle

- THE LEADER IN PIPE INNOVATION
- THE HIGHEST LEVEL OF QUALITY
- THE LARGEST BREADTH OF PRODUCT
- THE WIDEST CAPACITY
- EXPRESS DELIVERY


## PLANT LOCATIONS

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JME-02A


JM Eagle™

*Building essentials for a better tomorrow™*

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F: 800.451.4170

**REGIONAL OFFICE:**

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T: 973.535.1633
F: 973.533.4185

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