

ULTRA BLUE™

MEETS AWWA C909 OR ASTM F1483



*Building essentials
for a better tomorrow™*



ULTRA BLUE™

PVCO Distribution C.I.O.D. Pipe

Pressure Class 150 & 200 psi

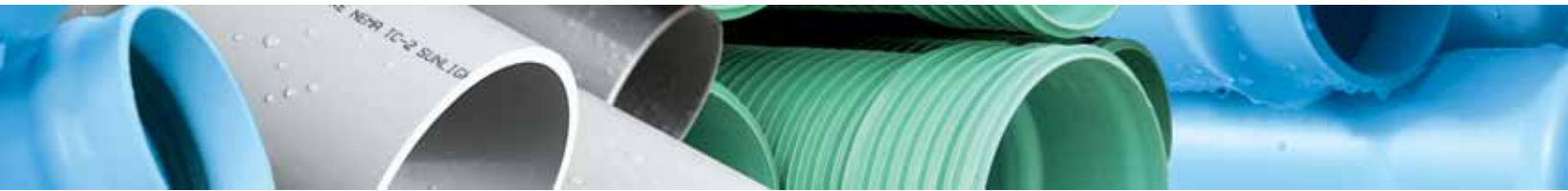
Pressure Class 100 psi, Size 16"

Gasketed Joints Size 6" - 12" and 16"

PVCO Pressure IPS Pipe

Pressure Rated 200 psi

Gasketed Joints Size 6" - 12"



ULTRA BLUE™

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PRODUCT DESCRIPTION

ULTRA BLUE™ AWWA C909 AND ASTM F1483 PVCO PIPE

FOR USE IN DISTRIBUTION, MUNICIPAL WATER SYSTEMS AND OTHER SERVICES

DESCRIPTION

JM Eagle's Ultra Blue™ pipes conform to the AWWA C909 and/or ASTM F1483 specifications, with gaskets meeting ASTM F477 and joints in compliance with ASTM D3139. Long-term hydrostatic pressure tests show Ultra Blue™ has a Hydrostatic Design basis (HDB) of 7,100 psi. Conventional PVC pressure pipe has an HDB of 4,000 psi. With equivalent safety factors the wall thickness of Ultra Blue™ can be reduced to approximately half that of conventional PVC pipe and still maintain the same pressure rating and meet the high safety requirements commonly needed by municipal water systems. Pipe is available in Cast Iron O.D.'s (CIOD) in 6"-12" PC 150 psi and PC 200 psi; 16" PC 100 psi. Pipe is also available in Iron Pipe Size O.D.'s (IPS) in 6"-12" PR 200 psi.

LONG LAYING LENGTHS

The standard laying length of Ultra Blue™ PVCO pipe is 20 feet. This means that more ground can be covered during installation while eliminating the cost of unnecessary joints.

LISTING STANDARDS ANSI/NSF STANDARD 61 UL 1285

See Short Form Specification.



APPLICATIONS

These products are typically used for distribution pipelines of potable water. However, this pipe may be used for gravity sewer, force main, and water reclamation projects. The pressure class of the pipe indicates the maximum allowable sustained pressure capacity with a long-term 2.5 to 1 safety factor and an additional surge allowance of 27, and 31 psi for PC 150, and PC 200, respectively, above the marked capacity of the pipe.

PURPLE RECLAIM AND GREEN SEWER FORCE MAIN

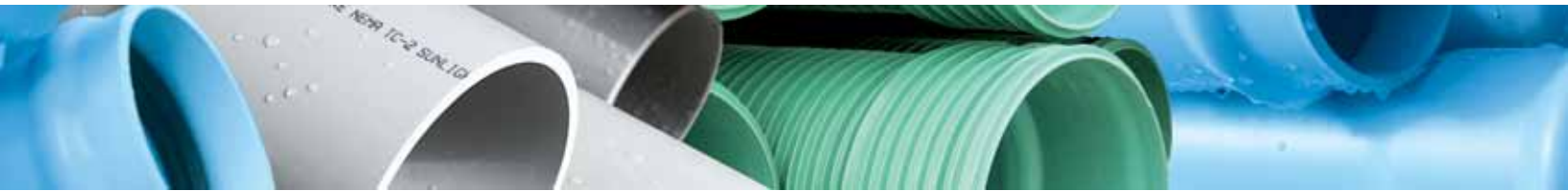
JM Eagle™ also manufactures this pipe in purple, specifically for reclaimed water systems and green for sewer force main applications. This pipe is made and tested to the same requirements as our standard products. The only difference is that the pigment used is purple or green. These products will not 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 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 <http://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

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

FLOW CAPACITY

This PVCO water pipe has a smooth interior that stays smooth over long years of service with 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.

SAVE IN HANDLING COSTS

JM Eagle™ Ultra Blue™ pipe is designed for installed-cost savings. Most sizes can be handled manually, so there is no need for costly installation equipment. Use the backhoe for excavating and backfilling only. Dig more trench, lay pipe faster, and save more in cost per foot installed.

FIELD CUTTING AND BEVELING

You can cut Ultra 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

Ultra Blue™ is lighter than Ductile Iron and conventional PVC of the same pressure class. That makes it easy to load, easy to transport and easy to handle. Installers prefer it because it goes into the ground quickly—thus saving on installation costs.



SERVICE LIFE

Because it is nonmetallic, the pipe does not lose strength due to either potable water corrosion or external galvanic soil conditions.

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."

Note: JM Eagle™ does not recommend direct tapping of Ultra Blue™ PVCO.



PRODUCT DESCRIPTION

ULTRA BLUE™ AWWA C909 AND ASTM F1483 PVCO PIPE

FOR USE IN DISTRIBUTION, MUNICIPAL WATER SYSTEMS AND OTHER SERVICES
(CONTINUED)

CAST IRON O.D. AND IPS OD

Available in 6", 8", 10", 12", and 16" diameter sizes, this pipe can be connected directly into cast/ductile iron fittings and pipe. Connections to products with other O.D. can be done using commonly available adapters or transition gaskets. Dimensions should be checked for use with butterfly valves.



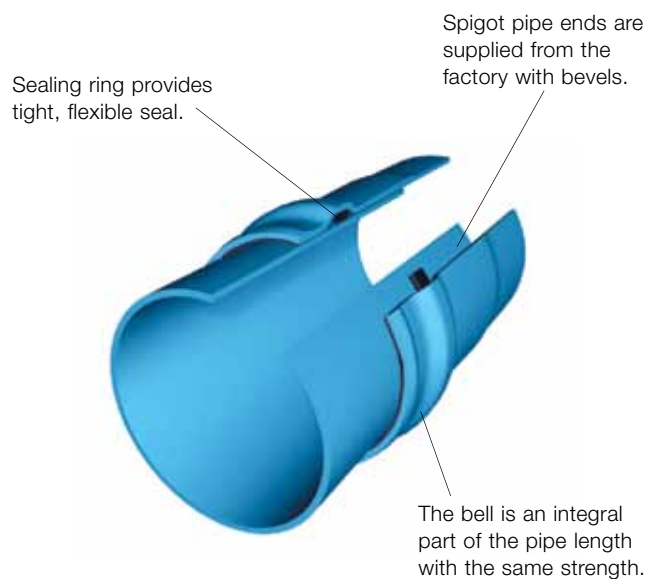
GASKET JOINTS WITH LOCKED-IN GASKETS

JM Eagle's gasket joint Ultra Blue™ can be assembled quickly. Seated in a deep groove, the flexible elastomeric 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 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:** DO NOT USE SOLVENT WELD CEMENT WITH ULTRA BLUE™ PRODUCTS.

GASKET JOINT



ACCESSORIES

JM Eagle's Ultra Blue™ PVCO pipe is compatible with all the items required for smooth installation of distribution pipelines.

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 6” water main will create surge pressures as shown in **Table 1** for different pipe materials. Note that AWWA C909 pressure capacities have already been reduced to the marked class on the pipe to accommodate a 2 fps instantaneous velocity change. For all system designs, surge pressures should be examined with the pipe material in use.

Lower surge pressures in PVC pipes are as the result of low pipe modulus and larger pipe modulus and larger pipe inside diameters.

TABLE 1

PRESSURE SURGES IN 6 IN. WATER MAIN

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

PIPE PRODUCT	PRESSURE SURGE	
	psi	kPa
Class 350 DI Pipe	109.0	751
PC 150 PVC Pipe	27	186

Pressure surges in PVC pipe of different Pressure Class 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. PRESSURE CLASS

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

PRESSURE CLASS	PRESSURE SURGE	
	psi	kPa
150	13.5	93
200	15.5	107

03

SHORT FORM SPECIFICATION

ULTRA BLUE™ AWWA C909 PVCO PIPE

SCOPE

This specification designates general requirements for 6" through 16" unplasticized Molecularly Oriented Polyvinyl Chloride (PVCO) plastic pressure pipe with integral bell and spigot joints for the conveyance of water and other fluids.

MATERIALS

This pipe shall meet the requirements of AWWA Standard C909, "Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe for Water Distribution". 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 length of pipe shall be tested to four times the pressure class of the pipe for a minimum of 5 seconds. The integral bell shall be tested with the pipe.

STANDARD LAYING LENGTHS

Standard laying lengths shall be 20 feet for all sizes.

PIPE

All Ultra Blue™ 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 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 C909. The joint design shall meet the 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-08-07, "Tapping Guide for PVC Pressure Pipe."

QUICK BURST TEST

Randomly selected samples tested in accordance with AWWA C909 shall withstand, without failure, the pressures listed below when applied in 60-70 seconds.

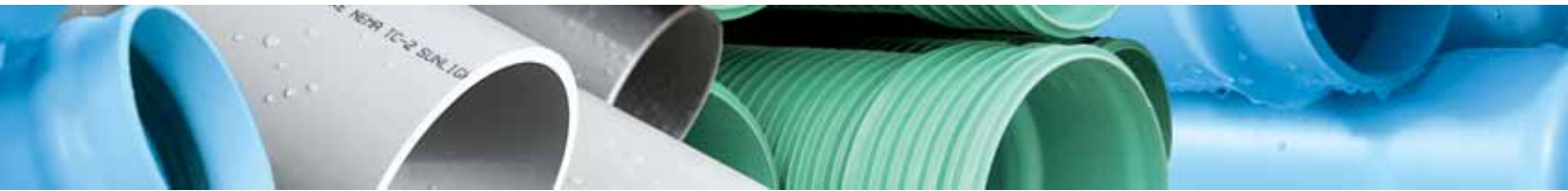
PRESSURE RATING (psi)	MINIMUM BURST PRESSURE AT 73°F (psi)
100	535
150	755
200	985

DROP IMPACT TEST

The pipe shall withstand the UL 1285 impact test requirements using Tup "B" and Flat Plate Holder "B" at the impact energy specified in the table.

PIPE SIZE (IN)	IMPACT (FT/LBS)
6	100
8	100
10	100
12	100

There shall be no visible evidence of cracking or splitting when the energy is imposed.



TESTING REQUIREMENTS FOR AWWA C909

TEST	PRESSURE CLASS		
	100 psi	150 psi	200 psi
LONG TERM PRESSURE TEST 1000 hours (psi)	350	500	650
SHORT TERM BURST TEST (psi)	535	755	985
EXTRUSION QUALITY OF PVC PIPE BY ACETONE IMMERSION TEST METHOD ASTM D2152	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
HYDROSTATIC PROOF TEST (each piece) (psi)	400	600	800

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

PROPERTY	AWWA C909 ULTRA BLUE™ PVC PIPE	ASTM TEST METHOD
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% 87% 64%	
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/100 ft/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

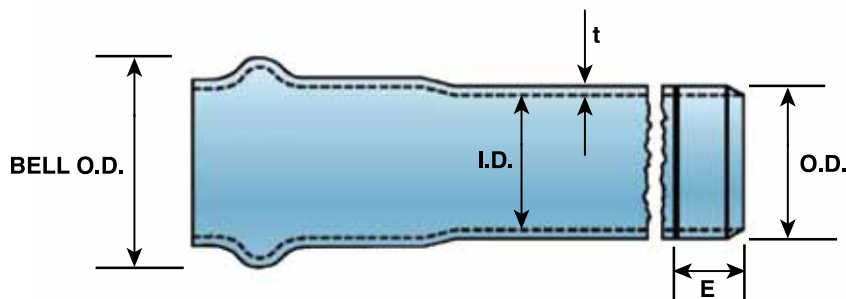
DIMENSIONS AND WEIGHTS

ULTRA BLUE™ AWWA C909 PVCO PIPE

SUBMITTAL AND DATA SHEET

PIPE SIZE (IN)	APPROX. BELL O.D. (IN)	AVERAGE O.D. (IN)	MIN. T. (IN)	APPROX. ID (IN)	STOP LINE DISTANCE MIN. E (IN)	APPROX. WEIGHT (LBS/FT)	APPROX. WEIGHT (LBS/JNT)
Pressure Class 150*							
6	8.40	6.90	0.209	6.45	5 ¾	2.8	56
8	10.75	9.05	0.274	8.47	6 ½	4.8	96
10	13.23	11.10	0.336	10.38	7 ¼	7.7	154
12	15.48	13.20	0.400	12.35	7 ¾	10.5	210
Pressure Class 200*							
6	8.53	6.90	0.271	6.32	5 ¾	3.7	75
8	10.92	9.05	0.355	8.29	6 ½	6.6	132
10	13.43	11.10	0.435	10.17	7 ¼	9.7	194
12	15.72	13.20	0.518	12.09	7 ¾	13.7	274
Pressure Class 100							
16	18.22	17.40	0.395	16.61	9 ½	13.4	268

* UL 1285 Listed — 6"-12" PC 150 and 6"-8" PC 200.



I.D. : Inside Diameter

O.D. : Outside Diameter

T. : Wall Thickness

E: Distance between Assembly Mark to the end of spigot

FLOW/FRICTION CHARTS

FLOW/FRICTION LOSS, ULTRA BLUE™ AWWA C909

6" C.I.O.D. (AWWA C909) ACTUAL O.D. 6.900 INCH

FLOW (GAL/MIN)	PRESSURE CLASS 150 psi		PRESSURE CLASS 200 psi	
	VELOCITY FT/S	PRESSURE DROP psi/100 FT	VELOCITY FT/S	PRESSURE DROP psi/100 FT
50	0.491	0.007	0.512	0.008
60	0.589	0.010	0.614	0.011
70	0.687	0.013	0.716	0.014
80	0.785	0.016	0.819	0.018
90	0.883	0.020	0.921	0.023
100	0.982	0.025	1.023	0.027
125	1.227	0.037	1.279	0.041
150	1.472	0.052	1.535	0.058
175	1.718	0.070	1.791	0.077
200	1.963	0.089	2.047	0.099
250	2.454	0.135	2.558	0.149
300	2.945	0.189	3.070	0.209
350	3.435	0.252	3.582	0.279
400	3.926	0.322	4.093	0.357
450	4.417	0.401	4.605	0.444
500	4.908	0.487	5.117	0.539
600	5.889	0.683	6.140	0.756
700	6.871	0.909	7.163	1.005
800	7.853	1.164	8.186	1.288
1000	9.816	1.759	10.233	1.947

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

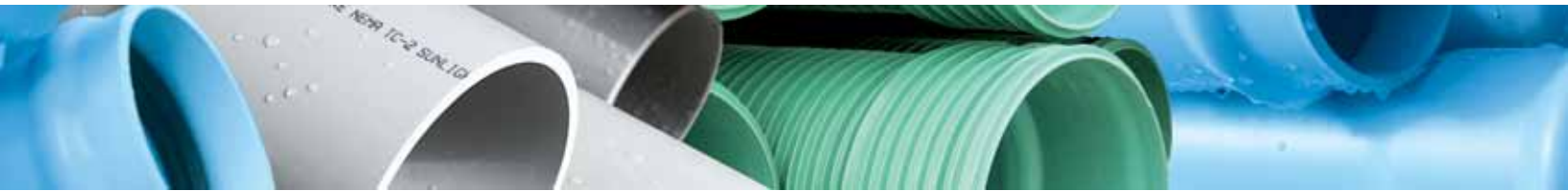
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FLOW/FRICTION LOSS, ULTRA BLUE™ AWWA C909

8" C.I.O.D. (AWWA C909) ACTUAL O.D. 9.050 INCH

FLOW (GAL/MIN)	PRESSURE CLASS 150 psi		PRESSURE CLASS 200 psi	
	VELOCITY FT/S	PRESSURE DROP psi/100 FT	VELOCITY FT/S	PRESSURE DROP psi/100 FT
100	0.571	0.007	0.595	0.007
125	0.713	0.010	0.743	0.011
150	0.856	0.014	0.892	0.015
175	0.999	0.019	1.041	0.021
200	1.141	0.024	1.189	0.026
250	1.426	0.036	1.487	0.040
300	1.712	0.051	1.784	0.056
350	1.997	0.067	2.081	0.074
400	2.282	0.086	2.379	0.095
450	2.568	0.107	2.676	0.118
500	2.853	0.130	2.973	0.144
600	3.424	0.182	3.568	0.202
700	3.994	0.243	4.163	0.268
800	4.565	0.311	4.757	0.344
1000	5.706	0.470	5.946	0.520
1200	6.847	0.659	7.136	0.728
1400	7.988	0.876	8.325	0.969
1600	9.129	1.122	9.514	1.241
2000	11.412	1.697	11.893	1.876

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, ULTRA BLUE™ AWWA C909

10" C.I.O.D. (AWWA C909) ACTUAL O.D. 11.100 INCH

FLOW (GAL/MIN)	PRESSURE CLASS 150 psi		PRESSURE CLASS 200 psi	
	VELOCITY FT/S	PRESSURE DROP psi/100 FT	VELOCITY FT/S	PRESSURE DROP psi/100 FT
175	0.664	0.007	0.692	0.008
200	0.759	0.009	0.790	0.010
250	0.948	0.013	0.988	0.015
300	1.138	0.019	1.186	0.021
350	1.327	0.025	1.383	0.028
400	1.517	0.032	1.581	0.035
450	1.707	0.040	1.779	0.044
500	1.896	0.048	1.976	0.053
600	2.276	0.068	2.371	0.075
700	2.655	0.090	2.767	0.099
800	3.034	0.115	3.162	0.127
1000	3.793	0.174	3.952	0.192
1200	4.551	0.244	4.743	0.270
1400	5.310	0.324	5.533	0.359
1600	6.068	0.416	6.324	0.459
2000	7.585	0.628	7.905	0.694
2500	9.481	0.950	9.881	1.050
3000	11.378	1.331	11.857	1.472

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, ULTRA BLUE™ AWWA C909

12" C.I.O.D. (AWWA C909) ACTUAL O.D. 13.200 INCH

FLOW (GAL/MIN)	PRESSURE CLASS 150 psi		PRESSURE CLASS 200 psi	
	VELOCITY FT/S	PRESSURE DROP psi/100 FT	VELOCITY FT/S	PRESSURE DROP psi/100 FT
300	0.805	0.008	0.839	0.009
350	0.939	0.011	0.978	0.012
400	1.073	0.014	1.118	0.015
450	1.207	0.017	1.258	0.019
500	1.341	0.021	1.398	0.023
600	1.609	0.029	1.677	0.032
700	1.878	0.039	1.957	0.043
800	2.146	0.050	2.236	0.055
1000	2.682	0.075	2.795	0.083
1200	3.219	0.105	3.354	0.116
1400	3.755	0.140	3.914	0.154
1600	4.292	0.179	4.473	0.198
2000	5.365	0.271	5.591	0.299
2500	6.706	0.409	6.988	0.452
3000	8.047	0.573	8.386	0.634
3500	9.388	0.763	9.784	0.843
4000	10.730	0.977	11.181	1.080
4500	12.071	1.215	12.579	1.343

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

SHORT FORM SPECIFICATION

ULTRA BLUE™ IPS ASTM F1483

SCOPE

This specification designates general requirements for 6" through 12", unplasticized Molecularly Oriented Polyvinyl Chloride (PVCO) plastic pressure pipe with integral bell and spigot joints for the conveyance of water and other fluids.

MATERIALS

This pipe shall meet the requirements of ASTM F1483 Standard Specification for Oriented Poly (Vinyl Chloride) PVCO Pressure 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.

STANDARD LAYING LENGTHS

Standard laying lengths shall be 20 feet for all sizes.

PIPE

All Ultra Blue™ 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 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 ASTM F1483. The joint design shall meet the 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-08-07, "Tapping Guide for PVC Pressure Pipe."

Note: JM Eagle™ does not recommend direct tapping for Ultra Blue™ PVCO.

QUICK BURST TEST

Randomly selected samples tested in accordance with ASTM F1483 shall withstand, without failure, the pressures listed below when applied in 60-70 seconds.

PRESSURE RATING (psi)	MINIMUM BURST PRESSURE AT 73°F (psi)
200	630

DROP IMPACT TEST

The pipe shall withstand the ASTM F1483 impact test requirements using Tup "B" and Flat Plate Holder "B" at the impact energy level specified in the table.

PIPE SIZE (IN)	IMPACT (FT/LBS)
6	150
8	200
10	200
12	200

There shall be no visible evidence of cracking or splitting when the energy is imposed.



SHORT FORM SPECIFICATION

ULTRA BLUE™ IPS ASTM F1483

(CONTINUED)

TESTING REQUIREMENTS FOR ASTM F1483

TEST	PRESSURE CLASS
	ASTM F1483
	200 psi
SUSTAINED PRESSURE TEST 1000 hours (psi)	420
SHORT TERM BURST TEST (psi)	630
EXTRUSION QUALITY OF PVC PIPE BY ACETONE IMMERSION TEST METHOD ASTM D2152	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

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

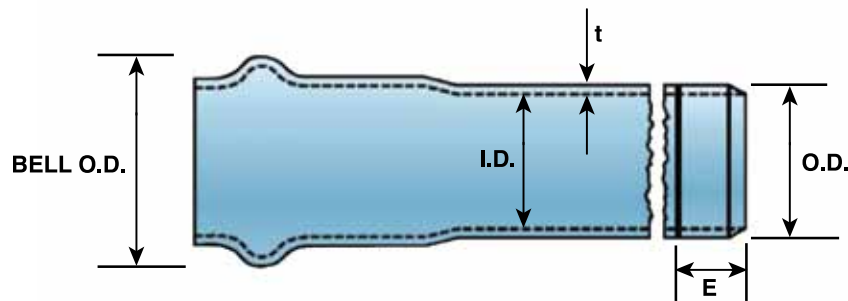
PROPERTY	ASTM F1483 ULTRA BLUE™ PVC PIPE	ASTM TEST METHOD
Fiber Stress at 73°F Short Term Bursting Strength (psi) min 1,000 Hour Strength (psi) min	11,100 7400	D1599 D1598
Working Pressure Rating 73°F (% of rating at 73°F) 80°F (% of rating at 73°F) 100°F (% of rating at 73°F)	100% 87% 64%	—
Chemical 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/100 ft/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	—

DIMENSIONS AND WEIGHTS

ULTRA BLUE™ ASTM F1483 PVCO PIPE

SUBMITTAL AND DATA SHEET

PIPE SIZE (IN)	APPROX. BELL O.D. (IN)	AVERAGE O.D. (IN)	MIN. T. (IN)	APPROX. I.D. (IN)	STOP LINE DISTANCE MIN. E (IN)	APPROX. WEIGHT (LBS/FT)	APPROX. WEIGHT (LBS/JNT)
RATING 200							
6	8 1/8	6.625	0.182	6.24	4 1/2	2.5	51
8	10 1/4	8.625	0.236	8.13	4 1/2	4.2	84
10	12 1/4	10.750	0.295	10.13	5 1/2	6.4	127
12	14 3/4	12.750	0.349	12.02	5 1/2	8.9	179



I.D. : Inside Diameter

O.D. : Outside Diameter

T. : Wall Thickness

E: Distance between Assembly Mark to the end of spigot

08

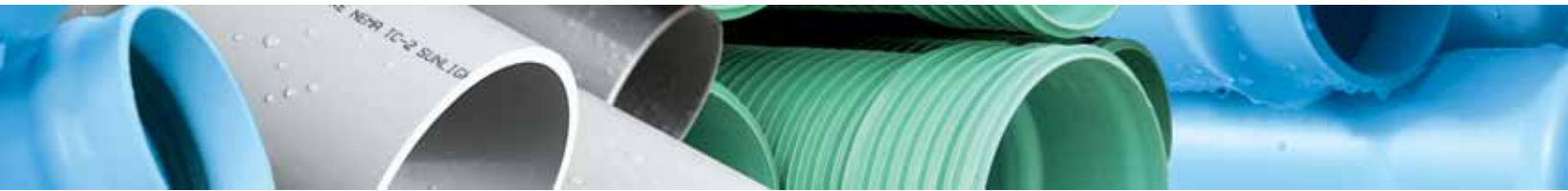
FLOW/FRICTION CHARTS

FLOW/FRICTION LOSS, ULTRA BLUE™ ASTM F1483

6" I.P.S. (ASTM F1483) ACTUAL O.D. 6.625 INCH

FLOW (GAL/MIN)	PRESSURE CLASS 200 psi	
	VELOCITY FT/S	PRESSURE DROP psi/100 FT
50	0.523	0.008
60	0.628	0.011
70	0.733	0.015
80	0.837	0.019
90	0.942	0.024
100	1.047	0.029
125	1.308	0.044
150	1.570	0.061
175	1.832	0.082
200	2.093	0.104
250	2.617	0.158
300	3.140	0.221
350	3.663	0.294
400	4.187	0.377
450	4.710	0.469
500	5.233	0.570
600	6.280	0.798
700	7.327	1.062
800	8.374	1.360
1000	10.467	2.057

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, ULTRA BLUE™ ASTM F1483

8" I.P.S. (ASTM F1483) ACTUAL O.D. 8.625 INCH

FLOW (GAL/MIN)	PRESSURE CLASS 200 psi	
	VELOCITY FT/S	PRESSURE DROP psi/100 FT
100	0.617	0.008
125	0.772	0.012
150	0.926	0.017
175	1.080	0.023
200	1.234	0.029
250	1.543	0.044
300	1.852	0.061
350	2.160	0.081
400	2.469	0.104
450	2.777	0.130
500	3.086	0.158
600	3.703	0.221
700	4.320	0.294
800	4.938	0.376
1000	6.172	0.569
1200	7.407	0.798
1400	8.641	1.061
1600	9.875	1.359
2000	12.344	2.054

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

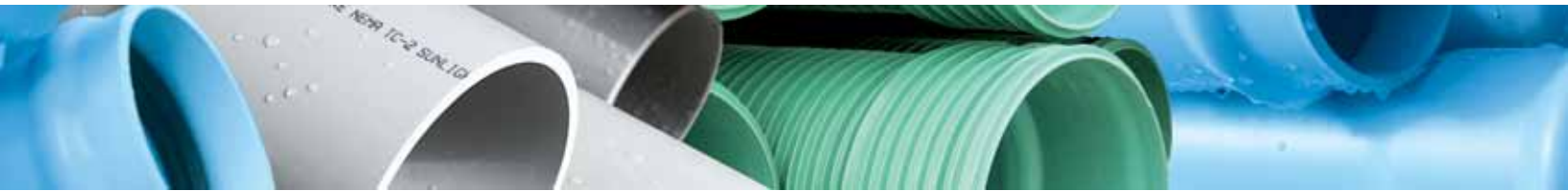
(CONTINUED)

FLOW/FRICTION LOSS, ULTRA BLUE™ ASTM F1483

10" I.P.S. (ASTM F1483) ACTUAL O.D. 10.750 INCH

FLOW (GAL/MIN)	PRESSURE CLASS 200 psi	
	VELOCITY FT/S	PRESSURE DROP psi/100 FT
175	0.696	0.008
200	0.795	0.010
250	0.994	0.015
300	1.192	0.021
350	1.391	0.028
400	1.590	0.036
450	1.789	0.044
500	1.987	0.054
600	2.385	0.076
700	2.782	0.101
800	3.180	0.129
1000	3.975	0.195
1200	4.770	0.273
1400	5.565	0.364
1600	6.360	0.466
2000	7.950	0.704
2500	9.937	1.065
3000	11.925	1.492

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, ULTRA BLUE™ ASTM F1483

12" I.P.S. (ASTM F1483) ACTUAL O.D. 12.750 INCH

FLOW (GAL/MIN)	PRESSURE CLASS 200 psi	
	VELOCITY FT/S	PRESSURE DROP psi/100 FT
300	0.847	0.009
350	0.989	0.012
400	1.130	0.016
450	1.271	0.019
500	1.412	0.024
600	1.695	0.033
700	1.977	0.044
800	2.260	0.056
1000	2.825	0.085
1200	3.390	0.119
1400	3.955	0.158
1600	4.520	0.203
2000	5.649	0.307
2500	7.062	0.464
3000	8.474	0.650
3500	9.886	0.865
4000	11.299	1.107
4500	12.711	1.377

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, ULTRA BLUE™ C909

16" C.I.O.D. (AWWA C909) PC 100 ACTUAL O.D. 17.400 INCH

FLOW (GAL/MIN)	PRESSURE CLASS 100 psi	
	VELOCITY FT/S	PRESSURE DROP psi/100 FT
900	1.332	0.015
1200	1.776	0.025
1500	2.221	0.038
1800	2.665	0.053
2100	3.109	0.071
2400	3.553	0.091
2700	3.997	0.113
3000	4.441	0.137
3300	4.885	0.164
3500	5.181	0.183
4000	5.922	0.234
4500	6.662	0.291
5000	7.402	0.354
5500	8.142	0.422
6000	8.882	0.496
6500	9.623	0.575
7000	10.363	0.660
7500	11.103	0.749

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

SHORT FORM INSTALLATION GUIDE/ WARNING

This information is furnished in order to provide a brief review of the installation requirements for JM Eagle™ Ultra 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. Curvature of 6"-12" pipe shall be accomplished through longitudinal bending of the pipe barrel in accordance with the following table. Deflection of the joint is not allowed and may cause leakage.

* JM Eagle's recommendation for 16" diameter 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 6 1/4". Joint deflection is achieved after the joint is assembled in straight alignment and to the assembly mark.
6. Prior to backfilling, check to see that the assembly mark is flush with the end of the bell.

PIPE SIZE (IN)	RADIUS (FT)
6	150
8	200
10	250
12	300

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."

Note: JM Eagle™ does not recommend direct tapping of Ultra Blue™ PVC 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.