

MEETS AWWA C909 OR ASTM F1483









# ULTRA BLUE™

PVCO Distribution C.I.O.D. Pipe
Pressure Class 235 & 305 psi
Pressure Class 165 psi, Size 16"
Gasketed Joints Size 6" - 12" and 16"

PVCO Pressure IPS Pipe Pressure Rated 200 psi Gasketed Joints Size 6" - 12"



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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 235 psi and PC 305 psi; 16" PC 165 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(+/- 1"). This means that more ground can be covered during installation while eliminating the cost of unneces-sary 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 235, and PC 305, 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<sup>™</sup> does not recommend direct tapping of Ultra Blue<sup>™</sup> 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.



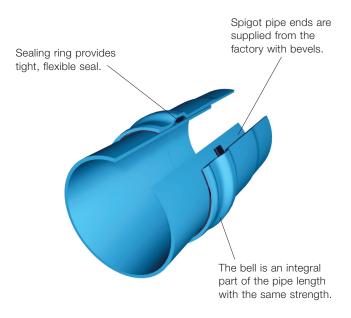
# GASKET JOINTS WITH LOCKED-IN GASKETS

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**



JM Eagle's Ultra  $Blue^{M}$  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 (PVCO) 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 PVCO 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 235 PVCO Pipe	27	186	

Pressure surges in PVCO 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 PVCO PIPE-PRESSURE SURGE VS. PRESSURE CLASS

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

	PRESSURE SURGE		
PRESSURE CLASS	psi	kPa	
235	13.5	93	
305	15.5	107	

# 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 bellow when applied in 60-70 seconds.

PRESSURE RATING (psi)	MINIMUM BURST PRESSURE AT 73F (psi)
165	535
235	755
305	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			
1231	165 psi	235 psi	305 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/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	

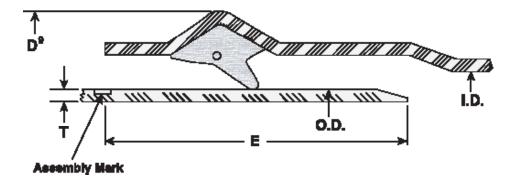


ULTRA BLUE™ AWWA C909 PVCO PIPE

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	e Class 235*			
6	8.53	6.90	0.221	6.43	5 3/4	3.21	56
8	10.83	9.05	0.290	8.44	61/2	5.50	96
10	13.43	11.10	0.356	10.35	7 1/4	8.36	154
12	15.72	13.20	0.423	12.31	7 ¾	11.87	210
Pressure Class 165							
16	20.05	17.40	0.395	16.56	9 ½	15.0	300

 $<sup>^{*}</sup>$  UL 1285 Listed - 6"-12" PC 235 and 6"-8" PC 305.



I.D.: Inside Diameter O.D.: Outside Diameter T.: Wall Thickness

E: Distance between Assembly Mark to the end of spigot

# FLOW/FRICTION LOSS, ULTRA BLUE™ AWWA C909

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

EL OW	PRESSURE C	LASS 235 psi	PRESSURE CLASS 305 psi	
FLOW (GAL/MIN)	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

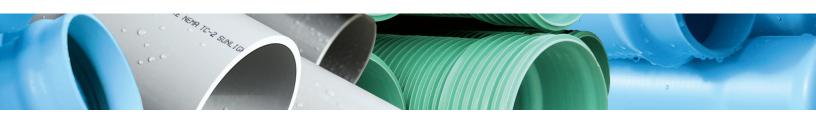


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# FLOW/FRICTION LOSS, ULTRA BLUE™ AWWA C909

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

FLOW	PRESSURE C	LASS 235 psi	PRESSURE C	CLASS 305 psi
FLOW (GAL/MIN)	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



# FLOW/FRICTION LOSS, ULTRA BLUE™ AWWA C909

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

FLOW	PRESSURE CLASS 235 psi		PRESSURE CLASS 305 psi	
(GAL/MIN)	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



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# FLOW/FRICTION LOSS, ULTRA BLUE™ AWWA C909

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

EL OW	PRESSURE C	LASS 235 psi	PRESSURE C	PRESSURE CLASS 305 psi	
FLOW (GAL/MIN)	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	

# FLOW/FRICTION LOSS, ULTRA BLUE™ AWWA C9O9

16" C.I.O.D. (AWWA C909) PC 165 ACTUAL O.D. 17.400 INCH

EL OW	PRESSURE C	CLASS 100 psi
FLOW (GAL/MIN)	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



# SHORT FORM SPECIFICATION

# ULTRA BLUE™ IPS ASTM F1483

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.

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 shall be 20 feet for all sizes.

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<sup>™</sup> does not recommend direct tapping for Ultra Blue<sup>™</sup> PVCO.

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

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.

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

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.

# 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

PROPERTY	ASTM F1483 ULTRA BLUE™ PVCO 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
<b>Thermal Expansion</b> (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	_

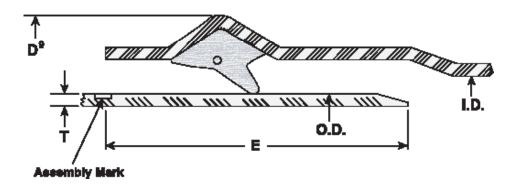


# **DIMENSIONS AND WEIGHTS**

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)
			PRESSURE	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

# FLOW/FRICTION LOSS, ULTRA BLUE™ ASTM F1483

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

EL OW	PRESSURE CLASS 200 psi			
FLOW (GAL/MIN)	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		



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# FLOW/FRICTION LOSS, ULTRA BLUE™ ASTM F1483

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

EL OW	PRESSURE C	LASS 200 psi
FLOW (GAL/MIN)	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

# FLOW/FRICTION LOSS, ULTRA BLUE™ ASTM F1483

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

EL OW	PRESSURE C	LASS 200 psi
FLOW (GAL/MIN)	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



(CONTINUED)

# FLOW/FRICTION LOSS, ULTRA BLUE™ ASTM F1483

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

El OW	PRESSURE CLA	ASS 200 psi
FLOW (GAL/MIN)	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

# 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™ PVCO 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<sup>™</sup> does not recommend direct tapping of Ultra Blue<sup>™</sup> PVCO.

# **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.



#### 1. PERIODS AND SCOPE OF COVERAGE

JM Eagle™ warrants that the pipe products certified to the standards of the American Water Works Association (AWWA) for water distribution, transmission and force sewer mains including C900, C905, C909, C901 and C906 products manu-factured by JM Eagle™ (each a "Product" and collectively, the "Products")\* are manufactured in accordance with the following AWWA, ASTM, ANSI/NSF, and UL standards as follows: (1) AWWA C900 and ASTM 1784 cell class 12454; Gaskets meet ASTM F477; Joints meet ASTM D3139; ANSI/NSF-61, UL 1285 for the C900, (2) AWWA C905 and ASTM 1784 cell class 12454; Gaskets meet ASTM F477; Joints meet ASTM D3139; ANSI/NSF-61, UL 1285 for C905, (3) AWWAC909 and UL 1285; Gaskets meet ASTM F477; Joints meet ASTM D3139 for C909 and (4) AWWA C901/906, ASTM D2239, ASTM D2737, ASTM D3035, F714, cell class per ASTM D3350, PPI listed material (TR-4) PE3408/3608 & PE4710, ASNI/NSF-14 for C901 and C906. JM Eagle™ warrants that each of these Products manufactured by JM Eagle™ leaves our plant free from defects in workmanship and materials. These Products as manufactured by JM Eagle™ are backed by our unprecedented fifty (50) year Limited Warranty. This Limited Warranty provides that Products manufactured by JM Eagle™ meet the above stated quality standards published by the AWWA, ASTM Interna-tional (ASTM), American National Standards Institute/NSF International (ANSI/NSF), and Underwriters Laboratories (UL).

If any Product is determined within fifty (50) years from the date of invoice by JM Eagle™ to be defective because it failed to meet the above stated standards, JM Eagle™ will then provide replacement product of the same type, size and quan-tity of the product and pay for the costs directly related to its replacement\*\*\* or issue credits, offsets or a combination thereof for the wholesale purchase price of the defective product.

JM Eagle™ also warrants that the design of our Products are independently tested and/or certified by AWWA, NSF and UL to meet their respective standards and that our plants manufacturing the Products are already certified or in process of being certified to ISO 9001 certification\*\* as part of our program to develop manufacturing processes that consistently produce high quality plastic pipe.

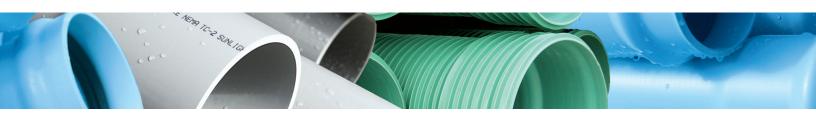
JM Eagle™ quality control programs encompass three critical aspects of the manufacturing process: the incoming raw material, pipe production, and the finished goods.

# 2. EXCLUSIONS FROM COVERAGE AND EXCLUSIVE REMEDY:

Products manufactured by JM Eagle™ are marked with JM Eagle, PW Eagle or US Poly stencil markings. This limited warranty excludes any Product not manufactured by JM Eagle™, even if it is sold by JM Eagle™, and also excludes defects or failures caused after shipment by:

- improper installation (including, without limitation, misalignment),
- use in improper applications or conditions or in conjunction with improper materials (including, without limitation, improper lubricants, pastes, solvents or sealants),
- contact with aggressive chemical agents, freezing or overheating of liquids in the Product, or unusual pressure surges or pulsation,
- vibration,
- · temperature shocking,
- U.V. degradation,

- failure to adhere to JM Eagle™'s instructions concerning the proper handling, installation, testing and use of the Product,
- failure to adhere to applicable standards set forth by local laws, codes, or regulations and the applicable industry standards, or
- any other improper activities not listed above or damage caused by the fault or negligence of anyone other than JM Eagle™.



THE WARRANTIES IN THIS LIMITED WARRANTY ARE THE ONLY WARRANTIES APPLICABLE TO THE PRODUCTS. THERE ARE NO OTHER WARRANTIES, REPRESENTATIONS OR CONDITIONS OF ANY KIND, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, WITH RESPECT TO THE PRODUCTS SUPPLIED HEREUNDER INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ALL SUCH WARRANTIES ARE HEREBY SPECIFICALLY DISCLAIMED AND JM EAGLE™ SHALL NOT BE LIABLE IN THIS RESPECT NOTWITHSTANDING JM EAGLE'S™ ACTUAL KNOWLEDGE OF THE PRODUCT'S INTENDED USE OR ANY ADVICE OR REPRESENTATIONS THAT MAY HAVE BEEN RENDERED BY JM EAGLE™ CONCERNING THE DESIGN, MANUFACTURE, FABRICATION, SALE, USE, INSTALLATION OR PROVISION OF THE PRODUCTS. NO STATEMENT, CONDUCT OR DESCRIPTION BY JM EAGLE™ OR ITS REPRESENTATIVES, IN ADDITION TO OR BEYOND THIS LIMITED WARRANTY, SHALL CONSTITUTE A WARRANTY.

BUYER AGREES THAT ITS SOLE AND EXCLUSIVE REMEDY FOR BREACH OF THIS LIMITED WARRANTY, AND THE SOLE AND EXCLUSIVE OBLIGATION OF JM EAGLE™ IN RESPECT OF ANY CLAIMS FOR BREACH OF THIS LIMITED WARRANTY, SHALL BE (1) THE REPLACEMENT OF THE SAME TYPE, SIZE AND LIKE QUANTITY OF NON-DEFECTIVE PRODUCT, AT THE ORIGINAL POINT OF DELIVERY AND COSTS RELATED TO ITS REPLACEMENT\*\*\*, OR (2) CREDITS, OFFSETS, OR A COMBINATION THEREOF, FOR THE WHOLESALE PURCHASE PRICE OF THE DEFECTIVE PRODUCT. IN NO EVENT SHALL JM EAGLE™ BE LIABLE FOR LOST PROFITS, LOSS OF GOODWILL, LOSS OF BUSINESS OPPORTUNITIES, DAMAGE TO REPUTATION, SPECIAL DAMAGES, INDIRECT DAMAGES, DELAY DAMAGES, PUNITIVE DAMAGES, EXEMPLARY DAMAGES, CONSEQUENTIAL DAMAGES OR INCIDENTAL DAMAGES.

# 3. REQUIREMENTS FOR MAKING CLAIMS:

Every claim for breach under this warranty shall be void unless it is made in writing to JM Eagle™ and postmarkedwithin five business (5) days of the date the defect was discovered or in the exercise of ordinary care should have been discovered and, in any event, the claim must also be made within fifty (50) years of the date of the JM Eagle™ invoice. As noted above, Products manufactured by JM Eagle™ are marked with a JM Eagle, PW Eagle or US Polystencil. This limited warranty excludes any Product not manufactured by JM Eagle™, even if it is sold by JM Eagle™.

Any claim for breach of warranty must be sent to:

PRODUCT ASSURANCE DEPARTMENT JM EAGLE 5200 W. CENTURY BOULEVARD LOS ANGELES, CA, 90045

For questions regarding claims, the Product Assurance Department may be also contacted at 1-800-621-4404 or JMWebSupport1@imeagle.com.

No claim under this limited warranty will be valid unless (1) proof of purchase with the date thereof as well as a description of the alleged defect in reasonable detail is presented to the satisfaction of JM Eagle™, (2) writtenpermission and/or a Return Goods Authorization (RGA) is obtained from JM Eagle™, (3) JM Eagle™ is given ameaningful and reasonable opportunity to inspect the allegedly defective Product and its installation at the site and (4) at JM Eagle™'s request, representative samples of the allegedly defective Product are returned to JM Eagle™ in accordance with JM Eagle™'s instructions.

Products covered by this Limited Warranty include similar PW Eagle and US Poly products manufactured by JM Eagle after July 1, 2007.

JM Eagle's Conroe Texas plant in the process of obtaining ISO 9001 certification. The other plants are already certified to ISO 9001.

<sup>\*\*\*</sup> Replacement costs shall be reasonable and based on industry standard cost parameters such as those listed in the RS Means Assemblies Cost Data Book.



# EXTENDED WARRANTY

#### NOTICE OF RETROACTIVE EXTENSION OF LIMITED WARRANTY

Pipe certified to the standards of the American Water Works Association (AWWA) for water distribution, transmission and force sewer mains including C900, C905, C909, C901 and C906 products manufactured by JM Eagle™ (hereinafter "Products")\* are now backed by ourunprecedented fifty (50) year limited warranty. (See www.jmeagle.com for full details). JM Eagle™ is proud to announce that it is so confi¬dent in the quality of its products, that effective April 1, 2010, it will retroactively extend similar warranty protection for Product manufacturing defect failures. For any Products manufactured by JM Eagle™ and purchased from JM Eagle™ since December 1, 1982, JM Eagle™ will ret¬roactively extend fifty (50) year warranty protection for any manufacturing defect that causes failure on or after April 1, 2010. As set forth in detail below, to be eligible for this retroactive extension, the Products need only have been manufactured by JM Eagle™, contain the originalstencil markings, have been purchased since December 1, 1982, and failed on or after April 1, 2010. The fifty (50) year retroactive extended warranty will begin to run on the date of invoice for purchase from JM Eagle™ and will expire fifty (50) years from that date.

### **EXTENDED RETROACTIVE LIMITED WARRANTY**

### 1. PERIODS AND SCOPE OF COVERAGE

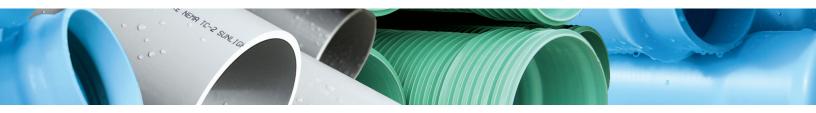
JM Eagle™ warrants through this retroactive extension of Limited Warranty that its pipe products certified to the standards of the American Water Works Association for water distribution, transmission and force sewer mains including C900, C905, C909, C901 and C906 products manufactured by JM Eagle™ (each a "Product" and collectively, the "Products")\* were manufactured in accordance with any of the follow¬ing AWWA, ASTM, ANSI/NSF, and UL standards then in existence as follows: (1) AWWA C900 and ASTM 1784 cell class 12454; Gaskets meet ASTM F477; Joints meet ASTM D3139; ANSI/NSF-61, UL 1285 for the C900, (2) AWWA C905 and ASTM 1784 cell class 12454; Gaskets meet ASTM F477; Joints meet ASTM D3139;ANSI/NSF-61, UL 1285 for C905, (3) AWWAC909 and UL 1285; Gaskets meet ASTM F477; Joints meet ASTM D3139 for C909 and (4) AWWA C901/906, ASTM D2239, ASTM D2737, ASTM D3035, F714, cell class per ASTM D3350, PPI listed material (TR-4) PE3408/3608 & PE4710, ASNI/NSF-14 for C901 and C906. JM Eagle™ warrants that each of these Products manufactured by JM Eagle™ are retroactively backed by our extended, unprecedented fifty (50) year Limited Warranty. This Limited Warranty provides that Products manufactured by JM Eagle™ met the applicable then-existing quality standards stated above and that are published by the AWWA, ASTM International (ASTM), American National Standards Institute/ NSF International (ANSI/NSF) and Underwriters Laboratories (UL).

If any Product fails after April 1, 2010 and is determined within fifty (50) years from the date of invoice by JM Eagle™ to be defective be¬cause it failed to meet the above stated standards, JM Eagle™ will then provide replacement product of the same type, size and quantity of the product and costs related to this replacement\*\* or issue credits, offsets or a combination thereof for the wholesale purchase price of the defective product.

### 2. EXCLUSIONS FROM COVERAGE AND EXCLUSIVE REMEDY:

Products manufactured by JM Eagle™ are marked with JM Eagle, PW Eagle or US Poly stencil markings. This limited warranty excludes any Product not manufactured by JM Eagle™, even if it is sold by JM Eagle™, and also excludes defects or failures caused after shipment by:

- improper installation (including, without limitation, misalignment),
- use in improper applications or conditions or in conjunction with improper materials (including, without limitation,
- improper lubricants, pastes, solvents or sealants),
- contact with aggressive chemical agents, freezing or overheating of liquids in the Product, or unusual pressure surges or pulsation,



- vibration,
- · temperature shocking,
- U.V. degradation,
- failure to adhere to JM Eagle™'s instructions concerning the proper handling, installation, testing and use of the Product,
- failure to adhere to applicable standards set forth by local laws, codes, or regulations and the applicable industry standards, or
- any other improper activities not listed above or damage caused by the fault or negligence of anyone other than JM Eagle™.

THE WARRANTIES IN THIS LIMITED WARRANTY ARE THE ONLY WARRANTIES APPLICABLE TO THE PRODUCTS. THERE ARE NO OTHER WARRANTIES, REPRESENTATIONS OR CONDITIONS OF ANY KIND, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, WITH RESPECT TO THE PRODUCTS SUPPLIED HEREUNDER INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ALL SUCH WARRANTIES ARE HEREBY SPECIFICALLY DISCLAIMED AND JM EAGLE™ SHALL NOT BE LIABLE IN THIS RESPECT NOTWITHSTANDING JM EAGLE™'S ACTUAL KNOWLEDGE OF THE PRODUCT'S INTENDED USE OR ANY ADVICE OR REPRESENTATIONS THAT MAY HAVE BEEN RENDERED BY JM EAGLE™ CONCERNING THE DESIGN, MANUFACTURE, FABRICATION, SALE, USE, INSTALLATION OR PROVISION OF THE PRODUCTS. NO STATEMENT, CONDUCT OR DESCRIPTION BY JM EAGLE™ OR ITS REPRESENTATIVES, IN ADDITION TO OR BEYOND THIS LIMITED WARRANTY, SHALL CONSTITUTE A WARRANTY.

BUYER AGREES THAT ITS SOLE AND EXCLUSIVE REMEDY FOR BREACH OF THIS LIMITED WARRANTY. AND THE SOLE AND EXCLUSIVE OBLIGATION OF JM EAGLE™ IN RESPECT OF ANY CLAIMS FOR BREACH OF THIS LIMITED WARRANTY, SHALL BE, (1) THE REPLACEMENT OF THE SAME TYPE, SIZE AND LIKE QUANTITY OF NON-DEFECTIVE PRODUCT, AT THE ORIGINAL POINT OF DELIVERY, AND COSTS DIRECTLY RELATED TO THIS REPLACEMENT\*\*\*, OR (2) CREDITS, OFFSETS, OR A COMBINATION THEREOF, FOR THE WHOLESALE PURCHASE PRICE OF THE DEFECTIVE PRODUCT. IN NO EVENT SHALL JM EAGLE $^{\mathrm{IM}}$  BE LIABLE FOR LOST PROFITS, LOSS OF GOODWILL, LOSS OF BUSINESS OPPORTUNITIES, DAMAGE TO REPUTATION, SPECIAL DAMAGES, INDIRECT DAMAGES, DELAY DAMAGES, PUNITIVE DAMAGES, EXEMPLARY DAMAGES, CONSEQUENTIAL DAMAGES OR INCIDENTAL DAMAGES.

## 3. REQUIREMENTS FOR MAKING CLAIMS:

Every claim for breach under this warranty shall be void unless it is made in writing to JM Eagle™ and postmarked within five business (5)days of the date the defect was discovered or in the exercise of ordinary care should have been discovered and, in any event, the claim must also be made within fifty (50) years of the date of the JM Eagle™ invoice. As noted above, Products manufactured by JM Eagle™ are marked with JM Eagle™, PW Eagle or US Poly stencils. This limited warranty excludes any Product not manufactured by JM Eagle™, even if it is sold by JM Eagle™. Any claim for breach of warranty must be sent to:

> PRODUCT ASSURANCE DEPARTMENT JM FAGLE 5200 W. CENTURY BOULEVARD LOS ANGELES, CA, 90045

For questions regarding claims, the Product Assurance Department may be also contacted at 1-800-621-4404 or JMWebSupport1@jmeagle.com.

No claim under this limited warranty will be valid unless (1) proof of purchase with the date thereof as well as a description of the alleged defect in reasonable detail is presented to the satisfaction of JM Eagle™, (2) written permission and/or a Return Goods Authorization (RGA) is obtained from JM Eagle™, (3) JM Eagle™ is given a meaningful and reasonable opportunity to inspect the allegedly defective Product and its installation at the site and (4) at JM Eagle™s request, representative samples of the allegedly defective Product are returned to JM Eagle™ in accordance with JM Eagle™'s instructions.

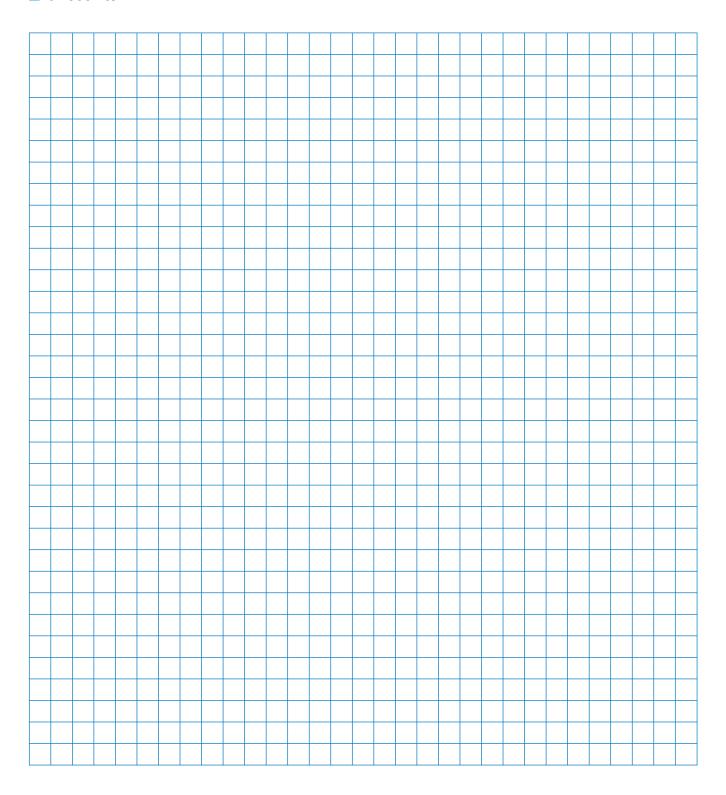
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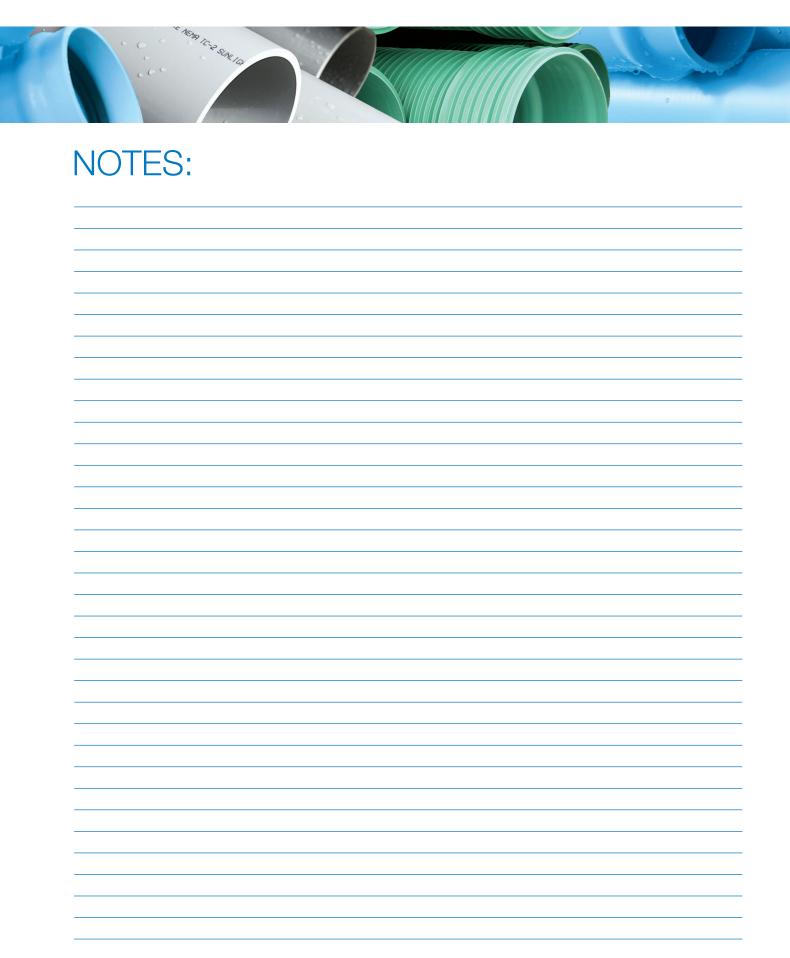
JM Eagle's Conroe Texas plant in the process of obtaining ISO 9001 certification. The other plants are already certified to ISO 9001.

<sup>\*\*\*</sup> Replacement costs shall be reasonable and based on industry standard cost parameters such as those listed in the RS Means Assemblies Cost Data Book.



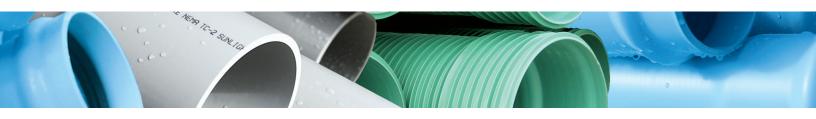
# DATA:







NOTES:



# PLANT LOCATIONS

#### **ADEL**

2101 J-M Drive Adel, Georgia 31620

## **BATCHELOR**

2894 Marion Monk Road Batchelor, Louisiana 70715

#### **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

# **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

### **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

# **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™.

<sup>\*</sup> Our Mexico location is a joint venture between JM Eagle™ and Plastics Technology





# **GLOBAL HEADQUARTERS:**

5200 West Century Blvd Los Angeles, CA 90045 T: 800.621.4404 F: 800.451.4170

# **REGIONAL OFFICE:**

Nine Peach Tree Hill Road Livingston, NJ 07039 T: 973.535.1633 F: 973.533.4185