UV Resistant Clear Pipe Dimensions & Pressure Ratings

Thin Walled UVR Pipe

Pipe Size	O.D.	Average I.D.	Min. Wall	Nominal Wt./Ft.	Max. W.P. PSI*
2	2.375	2.173	0.091	0.456	80
3	3.500	3.210	0.135	0.966	80
4	4.500	4.134	0.172	1.569	80
6	6.625	6.251	0.172	2.391	70
8	8.625	8.251	0.172	3.134	53
10	10.750	10.376	0.172	3.923	43
12	12.750	12.376	0.172	4.666	36

De-rating Factors @ Elevated Temperature	
Operating Temp °F	De-rating Factor
73	1.00
80	0.88
90	0.75
100	0.62
110	0.51
120	0.40
130	0.31
140	0.22

Schedule 40 UVR Pipe

Pipe Size	O.D.	Average I.D.	Min. Wall	Nominal Wt./Ft.	Max. W.P. PSI*
1/2	0.840	0.602	0.109	0.170	300
3/4	1.050	0.804	0.113	0.226	240
1	1.315	1.029	0.133	0.333	220
1-1/4	1.660	1.360	0.140	0.450	180
1-1/2	1.900	1.590	0.145	0.537	170
2	2.375	2.047	0.154	0.720	140
2-1/2	2.875	2.445	0.203	1.136	150
3	3.500	3.042	0.216	1.488	130
3-1/2	4.000	3.521	0.226	1.789	120
4	4.500	3.998	0.237	2.118	110
6	6.625	6.031	0.280	3.733	90

Maximum Service Temperature = 140°F

The temperature de-rating factors shown in table at left can be multiplied by the pressure ratings listed for each pipe size to determine the maximum pressure rating of the pipe at the specified elevated operating temperatures.

*Pressure Rating @ 73 °F

Developed to Promote Algae Growth in Bioreactor, Biofuel, Bioremediation, Research and Aquaculture Applications

Spears® EverCLEAR™ UV Resistant (UVR) PVC piping is suitable for use where exposure to sunlight is desired. The modified clear PVC material allows light in but blocks the harmful wavelengths that damage the plastic pipe.

Produced in both Thin Walled UVR pipe down to 0.135" and Schedule 40 UVR pipe to allow rapid growth of algae and provide pressure ratings needed for circulation. Commercial use has found that UV blocking PVC provides excellent Photosynthetically Available Radiation (PAR) for algae growth. Using specialty EverCLEAR™ PVC piping is beneficial in construction of photobioreactors since clarity is critical in allowing optimum light into the process to allow the algae to grow and feed. The Thin Walled version of Spears® EverCLEAR™ Ultraviolet Resistant (UVR) PVC pipe has been found to optimize light transmission while maintaining the necessary rigidity for durable construction. The advantages of EverCLEAR™ UVR PVC includes corrosion resistance, durability, non-conductivity, light weight construction and can be easily joined using Spears® PVC Clear solvent cements and primers using standard solvent cement welding practices.

Material

Spears® EverCLEAR™ UV Resistant (UVR) PVC piping material has been specially developed for optimum UV resistance. Independent testing has shown high stability of clarity and color in Spears® EverCLEAR™ UVR piping material from actual one year weather exposure tests in Arizona, Florida, and Ohio.

Spears® EverCLEAR™ UVR chemical resistance is similar to conventional clear PVC, and is generally resistant to most acids, bases, salts, and oxidants. However, exposure to chemicals may result in discoloration over time, especially certain bleaches, oxidizing agents, and nitrogen containing organics, As a result, in-service testing under actual conditions is recommended.

THE MAXIMUM SERVICE TEMPERATURE FOR PVC UVR CLEAR IS 140°F

SPEARS® CLEAR UVR PIPE MUST BE PROTECTED FROM FREEZING

Suitable for Oil-Free air handling to 25 psi, not for distribution of compressed air or gas
See Spears® Product Sourcebook for product offerings

PVC Physical Properties

GENERAL	Value	Test Method
Specific Gravity, (g/cu.cm @ 73°F)	1.38	ASTM D792
Cell Classification	11553	ASTM D1784
Maximum Service Temperature	140°F	
Color	Transparent / slight blue tint	
Hardness, Shore D	85	ASTM D2240
Hazen-Williams Factor	C=150	
MECHANICAL		
Tensile Modulus of Elasticity, psi @ 73°F	416,000	ASTM D638
Tensile Strength, psi @ 73°F	8,250	ASTM D638
Flexural Modulus, psi @ 75°F	423,000	ASTM D790
Flexural Strength, psi @ 75°F	13,600	ASTM D790
Izod Impact notched - injection molded, .125 in. bars, 73°F	3.9 ft-lbs./in.	ASTM D256
THERMAL		
Coefficient of Linear Expansion (in/in/°F)	3.9 x 10-5	ASTM D696
Deflection Temperature Under Load, Annealed, 264 psi, .125 in. Bars	142°F	ASTM D648
FLAMMABILITY		
Flame Rating	V-0	UL-94

Joining Methods

Spears® PVC EverCLEAR™ pipe is easily joined by a standard solvent cementing process, threaded connections and flanges. To maintain system clarity, Spears® recommends the use of a clear, medium-bodied, fast-setting cement in conjunction with a clear primer for optimum joint integrity. See Installation section for industrial pressure pipe for guidelines. Threading of Thin Walled or Schedule 40 EverCLEAR™ UVR PVC pipe is not a recommended practice due to insufficient wall thickness.

Thermal Expansion and Contraction

Standard calculations for thermal expansion and contraction may be applied to Spears® EverCLEAR™ UVR PVC. The coefficient of linear expansion for Spears® EverCLEAR™ UVR pipe is 3.9 x 10^{-5} in./in./°F. The rate of expansion or contraction can be calculated as follows:

$\Delta L = 12\ yL\ (\Delta T)$

Where:

ΔL = Expansion or contraction in inches

y = 4.1 x 10^{-5} (coefficient of linear expansion)

L = Length of piping run in feet

T = Temperature change °F (T max.-T @ installation)

Hangers and Supports

Spears® EverCLEAR™ UVR PVC piping should be mounted and supported in the same manner as PVC industrial piping. However, heat deformation and mechanical loads need additional consideration with EverCLEAR™ UVR piping and should not be deflected more than 3% of the outside diameter. Thin Walled pipe must be supported properly to avoid buckling and provide circumferential support to maintain roundness. Support location and spacing are based on the pipe diameter, operating temperature of the system, and the location of any concentrated stress loads (i.e., valves, flanges, and any other heavy system components). Hangers used must have an adequate load-bearing surface free of any rough or sharp edges that could damage the piping during use. They must also not restrict linear movement of the system due to the effects of expansion and contraction; over tightening must be avoided.

Thin Walled UVR Support Spacing

Pipe Size (inches)	Maximum Support Spacing in Feet				
	60°F	80°F	100°F	120°F	140°F
2	4-1/2	4-1/2	4	3-1/2	3
3	5-1/2	5-1/2	5	4-1/2	3-1/2
4	6-1/2	6	5-1/2	5	4
6	6-1/2	6	5-1/2	5	4
8	6	5-1/2	5	4-1/2	4
10	5-1/2	5-1/2	5	4-1/2	3-1/2
12	5	5	4-1/2	4	3-1/2

Schedule 40 UVR Support Spacing

Pipe Size (inches)	Maximum Support Spacing in Feet				
	60°F	80°F	100°F	120°F	140°F
½	4½	4½	4	2½	2½
¾	4½	4½	4	2½	2½
1	5½	5	4½	3	2½
1-1/4	5½	5½	5	3	3
1-1/2	6	5½	5	3½	3
2	6	5½	5	3½	3
2-1/2	7	6½	6	4	3½
3	7	7	6	4	3½
3-1/2	7½	7	6½	4	4
4	7½	7	6½	4½	4
6	8½	8	7½	5	4½