



**Pipe & Hangers Technical**  
**Special Pipe- Spears® PVC Clear**

Spears® PVC EverCLEAR™ Schedule 40 or Schedule 80 piping provides optimum clarity for critical visual monitoring of processes fluids. Joined using standard solvent cement welding with clear cement, clear systems provide the many benefits of regular PVC, such as excellent corrosion resistance, smooth interior walls, non-contaminating, non-conductive, light weight, good pressure handling capacity, superior impact strength and does not support bacterial growth.

A supplemental line of 1/4" through 12" Spears® PVC EverCLEAR™ fittings are available. Socket-style fittings are manufactured in strict dimensional compliance with ASTM D 2466 to Schedule 40 requirements. Spears® Special Reinforced Plastic Thread (SR) female threaded transition fittings, incorporating a stainless steel retaining ring, reduce problems associated with over tightening and provide a strong, leak-tight seal for plastic-to-metal transitions. Specialty transition fittings are manufactured to Schedule 80 dimensions per the applicable requirements of ASTM D 2467. See Spears® Schedule 40 or Schedule 80 fitting weight and dimension publications for available sizes and configurations. Spears® PVC EverCLEAR™ can be easily installed with systems of regular PVC pipe, fittings and valves. In addition, an endless selection of fully compatible PVC components and accessories are readily available.

**Material**

Spears® PVC EverCLEAR™ piping is produced from a rigid, lead-free virgin Polyvinyl Chloride (PVC) compound with superior impact resistance and a maximum service temperature of 14°F when appropriate temperature/pressure de-rating factors are applied. Spears® PVC EverCLEAR™ materials are certified by the NSF International for use with potable water under ANSI/NSF® Spears® Standard 61 and acceptable for food contact under the provisions of Title 21 of the United States FDA Code of Federal Regulations. Spears® PVC EverCLEAR™ piping also exhibits excellent flammability characteristics and will not sustain combustion when flame source is removed.

Spears® PVC EverCLEAR™ provides the excellent chemical resistance properties of PVC piping. It is resistant to most acids, bases, salts and oxidants. PVC chemical resistance data should be referenced for proper application. Although this material maintains its physical properties when exposed to many substances, exposure to certain chemicals can affect the clarity of the product over time. Certain nitrogen containing organics, bleaches, oxidative agents and acids may result in discoloration. Testing under actual use conditions is recommended. Exposure to sunlight (Ultra-Violet Radiation) will also affect clarity. EverCLEAR™ products do not contain UV stabilizers and are not recommended for outdoor use unless adequate protection is applied.

| <b>EverCLEAR™ PVC Pipe Physical Properties</b>      |                        |                    |
|---|------------------------|--------------------|
| <b>GENERAL</b>                                      | <b>Value</b>           | <b>Test Method</b> |
| Cell Classification                                 | 12454                  | ASTM D 1784        |
| Maximum Service Temp.                               | 140°F                  |                    |
| Color   | Transparent            |                    |
| Specific Gravity, (g/cu.cm @ 73°F)                  | 1.33                   | ASTM D 792         |
| Hardness, Shore D                                   | 84                     | ASTM D 2240        |
| Hazen-Williams Factor                               | C = 150                |                    |
| <b>MECHANICAL</b>                                   |                        |                    |
| Tensile Strength, psi @ 73°F                        | 7,260                  | ASTM D 638         |
| Tensile Modulus of Elasticity,psi @ 73°F            | 392,000                | ASTM D 638         |
| Flexural Strength, psi @ 75°F                       | 12,000                 | ASTM D 790         |
| Flexural Modulus, psi @ 75°F                        | 389,000                | ASTM D 790         |
| Compressive Strength, psi @ 75°F                    | 8,300                  | ASTM D 695         |
| Compressive Modulus, psi @ 75°F                     | 307,000                | ASTM D 695         |
| Notched Izod Impact - .125" Injection Molded        | 23 ft-lbs./in.         | ASTM D 256         |
| Notched Izod Impact - .125" With Flow-Comp. Molded  | 8.0 ft-lbs./in.        | ASTM D 256         |
| Notched Izod Impact - .125" Cross Flow-Comp. Molded | 2.0 ft-lbs./in         | ASTM D 256         |
| <b>THERMAL</b>                                      |                        |                    |
| Coefficient of Linear Expansion (in/in/°F)          | 4.1 x 10 <sup>-5</sup> | ASTM D 696         |
| Heat Distortion Temp., 264 psi, .125 in. Bars       | 154°F                  | ASTM D 648         |
| Glass Transition Temp.                              | 176°F                  |                    |
| <b>FIRE PERFORMANCE</b>                             |                        |                    |
| Flammability Rating                                 | V-0                    | UL-94              |

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**Schedule 40 Dimensions**

| Nom. Pipe Size (in.) | O.D.   | Average I.D. | Min. Wall | Nom. Wt./Ft. | Max. W.P. PSI |
|----------------------|--------|--------------|-----------|--------------|---------------|
| 1/4                  | 0.540  | 0.344        | 0.088     | 0.086        | 390           |
| 3/8                  | 0.675  | 0.473        | 0.091     | 0.115        | 310           |
| 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     | 3.73         | 90            |
| 6-1/2                | 6.625  | 6.335        | 0.110     | 1.64         | 45            |
| 8                    | 8.625  | 7.942        | 0.322     | 5.619        | 80            |
| 10                   | 10.750 | 9.976        | 0.365     | 7.966        | 70            |
| 12                   | 12.750 | 11.889       | 0.406     | 10.534       | 70            |

THE MAXIMUM SERVICE TEMPERATURE FOR PVC EverCLEAR™ IS 140°F.

Threading of Schedule 40 PVC EverCLEAR™ pipe is not a recommended practice due to insufficient wall thickness.

**Joining Methods**

Spears® PVC EverCLEAR™ pipe is easily joined by 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.

**Thermal Expansion and Contraction**

Standard calculations for thermal expansion and contraction may be applied to Spears® PVC clear. The coefficient of linear expansion for Spears® Clear pipe is 4.1 x 10-5 in./in./°F. The rate of expansion or contraction can be calculated as follows:

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

Where:

$\Delta L$  = 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® PVC EverCLEAR™ piping should be mounted and supported in the same manner as PVC industrial piping. 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). As with regular PVC piping, 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. See Hangers and Supports section for industrial pressure pipe for additional information.

**Schedule 80 Dimensions**

| Nom. Pipe Size (in.) | O.D.  | Average I.D. | Min. Wall | Nom. Wt./Ft. | Max. W.P. PSI |
|----------------------|-------|--------------|-----------|--------------|---------------|
| 1/4                  | 0.540 | 0.282        | 0.119     | 0.105        | 570           |
| 3/8                  | 0.675 | 0.403        | 0.126     | 0.146        | 460           |
| 1/2                  | 0.840 | 0.526        | 0.147     | 0.213        | 420           |
| 3/4                  | 1.050 | 0.722        | 0.154     | 0.289        | 340           |
| 1                    | 1.315 | 0.936        | 0.179     | 0.424        | 320           |
| 1-1/4                | 1.660 | 1.255        | 0.191     | 0.586        | 260           |
| 1-1/2                | 1.900 | 1.476        | 0.200     | 0.711        | 240           |
| 2                    | 2.375 | 1.913        | 0.218     | 0.984        | 200           |
| 3                    | 3.500 | 2.864        | 0.300     | 2.010        | 190           |
| 4                    | 4.500 | 3.786        | 0.337     | 2.938        | 160           |
| 6                    | 6.625 | 5.709        | 0.432     | 5.610        | 140           |

**De-Rating Factor**

| 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             |

**Critical Collapse Pressure PSI @ 73°F**

| Pipe Size (in.) | SCH 40 | SCH 80 |
|-----------------|--------|--------|
| 1/4             | 7,504  | 22,172 |
| 3/8             | 3,714  | 11,869 |
| 1/2             | 3,255  | 9,370  |
| 3/4             | 1,722  | 4,985  |
| 1               | 1,399  | 3,841  |
| 1-1/4           | 767    | 2,158  |
| 1-1/2           | 554    | 1,599  |
| 2               | 327    | 1,014  |
| 2-1/2           | 431    | 1,176  |
| 3               | 279    | 809    |
| 3-1/2           | 211    | 632    |
| 4               | 169    | 521    |
| 6               | 84     | 333    |
| 8               | 57     | -      |
| 10              | 43     | -      |
| 12              | 35     | -      |