Harvel Clear™ PVC

Schedule 40 & 80 Rigid PVC Piping Systems

Harvel Clear™ Rigid PVC piping provides a versatile, cost-effective alternative for many piping applications, particularly those where visual monitoring of processes is critical.

The benefits of rigid PVC piping are well recognized: exceptional corrosion resistance; smooth interior walls for unimpeded flow and reduced sediment buildup; non-contaminating for purity applications; fast, reliable solvent-welded connections; good pressure-bearing capability; and ease of handling and installation, to name a few.

All of these important benefits are now available in a unique product with optimum clarity. This clarity provides the all-round visibility that specialized applications demand — whether it be clean room applications, sight glass, dual-containment or various other processing applications where continuous monitoring is necessary.

- Manufactured to Schedule 40 and Schedule 80 IPS dimensions
- Full line of 1/4” through 8” Harvel Clear™ fittings
- Simple solvent-welded joining techniques
- Fully compatible with standard PVC pipe, fittings and valves
- Corrosion resistant
- Non-conductive
- Resists bacterial and biological activity
- Wide range of chemical resistance
- Lightweight, easy to handle and install
- Neatly boxed and packaged on-line, providing clean, scratch-free quality with every order
- Standard plain-end 10-foot lengths; belling and custom lengths available
- Lower overall installed cost than other alternatives

Clear PVC Pipe Physical Properties

GENERAL	**Value**	**Test Method**
Cell Classification	12454	ASTM D1784
Maximum Service Temp.	140°F	
Color	Transparent	
Specific Gravity, (g/cu.cm @ 73°F)	1.33	ASTM D792
Hardness, Shore D	84	ASTM D2240
Hazen-Williams Factor	C = 150	
MECHANICAL		
Tensile Strength, psi @ 73°F	7,260	ASTM D638
Tensile Modulus of Elasticity, psi @ 73°F	392,000	ASTM D638
Flexural Strength, psi @ 75°F	12,000	ASTM D790
Flexural Modulus, psi @ 75°F	389,000	ASTM D790
Compressive Strength, psi @ 75°F	8,300	ASTM D695
Compressive Modulus, psi @ 75°F	307,000	ASTM D695
Izod Impact notched - Method A, with Grain-Comp. Molded, .125 in. bars, 73°F	8.0 ft-lbs./in.	ASTM D256
Izod Impact notched - Method A, against Grain-Comp. Molded, .125 in. bars, 73°F	2.0 ft-lbs./in.	ASTM D256
THERMAL		
Coefficient of Linear Expansion (in/in/°F)	4.1×10^{-5}	ASTM D696
Heat Distortion Temp., Unannealed , 264 psi, .125 in. Bars	154°F	ASTM D648
Glass Transition Temp.	176°F	

FIRE PERFORMANCE

Flammability Rating	V-0	UL-94

MATERIAL

Harvel Clear™ PVC piping is produced from a rigid, virgin Polyvinyl Chloride (PVC) compound with a Cell Classification of 12454 per ASTM D1784. This material enables Harvel Clear piping to safely carry a maximum service temperature of 140°F when appropriate temperature/pressure de-rating factors are applied. In addition to exhibiting desirable physical properties and optimum transparency, this material is listed by the National Sanitation Foundation as being safe for use with potable water (NSF International Standard 61), and also complies with the provisions of Title 21 of the United States FDA Code of Federal Regulations as being safe for use in food contact applications. Due to the non-contaminating nature of Harvel Clear PVC piping products, extensive chemical extraction testing has been conducted to evaluate their use in ultra pure applications. Details pertaining to extractable analysis is available from Harvel upon request.

Harvel Clear™ provides similar reliable chemical resistance properties that conventional PVC piping has demonstrated over the years. In general, it is resistant to most acids, bases, salts and oxidants; detailed chemical resistance data is available and should be referenced for proper material selection.

Since this material is a nonconductor, Harvel pipe is not subject to electrolytic or galvanic corrosion. This material is compatible with conventional PVC pipe, fittings and valves, and can be incorporated into existing PVC systems via the solvent cement joining process. In addition to a full line of Schedule 40 clear fittings for most applications, an endless array of standard PVC components and accessories are readily available. Harvel Clear™ PVC exhibits excellent flammability characteristics as well.

Clear PVC Piping: Schedule 40 & 80

Application:

Corrosion resistant CLEAR pressure pipe, IPS sizes 1/4" through 12", for use at temperatures up to and including 140°F. Pressure rating (70 psi to 570 psi) varies with schedule, pipe size, and temperature as stated on page 2 of this specification and in Harvel Plastics, Inc. Clear bulletin (Product Bulletin HPB-107). Generally resistant to most acids, bases, salts, aliphatic solutions, oxidants, and halogens. Chemical resistance data should be referenced for proper material selection. Pipe exhibits excellent physical properties and optimum clarity. Typical applications include process, sight glass, and dual containment piping as found in chemical processing, high purity applications, food processing, pharmaceuticals, laboratory use, waste treatment, plating, and other applications involving fluid transfer where visual monitoring of process lines is warranted.

Scope:

This specification outlines minimum manufacturing requirements for CLEAR Polyvinyl Chloride (PVC) Schedule 40 and Schedule 80 iron pipe size (IPS) pressure pipe. This pipe is intended for use in systems where the fluid conveyed does not exceed 140°F. This pipe meets and or exceeds applicable industry standards and requirements as set forth by the American Society for Testing and Materials (ASTM).

PVC Materials:

The material used in the manufacture of the pipe shall be a rigid polyvinyl chloride (PVC) compound, with a Cell Classification of 12454 as defined in ASTM D1784. This compound shall comply with the provisions of Title 21 United States FDA Code of Federal Regulations and shall be safe for use with food contact applications. This compound shall be transparent in color, and shall be approved by NSF International for use with potable water (NSF Std 61).

Dimensions:

PVC Clear Schedule 40 and Schedule 80 pipe shall be manufactured in strict accordance with the dimensional requirements of ASTM D1785 to Schedule 40 or Schedule 80 dimensions and tolerances as applicable. All PVC Clear pipe shall meet the minimum burst pressure requirements and water pressure rating requirements of PVC Type II, Grade I, established for PVC 2110 as defined in ASTM D1785. Each production run of pipe shall also meet or exceed the test requirements for materials, workmanship, flattening, and extrusion quality defined in ASTM D1785. All belled-end pipe shall have tapered sockets to create an interference-type fit, which meet or exceed the dimensional requirements and the minimum socket length for pressure-type sockets as defined in ASTM D2672.

Marking:

All Clear PVC Schedule 40 and Schedule 80 pipe shall be permanently embossed with the manufacturers name or (or the manufacturers trademark when privately labeled), pipe size, dimension (i.e. Sch 40 or Sch 80), and date and time of manufacture.

Sample Specification:

All PVC Schedule 40 & Schedule 80 CLEAR pipe shall be manufactured from a Type I, Grade I Polyvinyl Chloride (PVC) compound with a Cell Classification of 12454 per ASTM D1784. The pipe shall be manufactured in strict compliance to ASTM D1785, consistently meeting and/or exceeding the applicable Quality Assurance test requirements of this standard with regard to material, dimensions, workmanship, burst pressure, flattening, and extrusion quality. The pipe shall be manufactured in the USA by an ISO 9001 certified manufacturer. All PVC CLEAR pipe shall be packaged immediately after its manufacture to prevent damage, and shall then be stored indoors at the manufacturing site until shipped from factory. All pipe shall be manufactured by HARVEL PLASTICS, INC.

Clear PVC Piping: Schedule 40 & 80

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	3.733	90
* 6 x 1/8	6.625	6.335	0.125	1.647	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

* This size does not meet Schedule 40 criteria

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
2-1/2	2.875	2.290	0.276	1.500	210
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

Chemical resistance data should be referenced for proper material selection and possible de-rating when working with fluids other than water. Refer to Harvel® Plastics 112/401 Product Bulletin for chemical resistance and installation data.

The pressure ratings given are for water, non-shock, @ 73˚F. The following temperature de-rating factors are to be applied to the working pressure ratings (WP) listed when operating at elevated temperatures.

Multiply the working pressure rating of the selected pipe at 73˚F, by the appropriate de-rating factor to determine the maximum working pressure rating of the pipe at the elevated temperature chosen.

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

Clear PVC Pipe Physical Properties

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Tensile Strength, psi @ 73°F	7,260	ASTM D638
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Izod Impact notched – Method A, against Grain- comp. Molded, .125 in. bars @73°F	2.0 ft.-lbs./in.	ASTM D256
Coefficient of Linear Expansion	4.10×10^{-5} in/in °F	ASTM D696
Heat Distortion Temp.	154°F	ASTM D648
Glass Transition Temperature	176°F	
Flammability Rating	V-0	UL-94

EX: 4" PVC SCH 40 CLEAR @ 120˚F = ?
110 psi x 0.40 = 44 psi max. @ 120˚F

THE MAXIMUM SERVICE TEMPERATURE FOR PVC CLEAR IS 140˚F.

Solvent-cemented joints should be utilized when working at or near maximum temperatures. Harvel® Plastics does not recommend the use of PVC for threaded connections at temperatures above 110˚F; use flanged joints, unions, or roll grooved couplings where disassembly is necessary at elevated temperatures.

Threading of Sch 40 PVC Clear pipe is not a recommended practice due to insufficient wall thickness.

NOTE Although Harvel Clear 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 (U.V.R.) will also affect clarity. Clear products do not contain U.V. stabilizers and are not recommended for outdoor use unless adequate protection is applied.