CPVC Industrial Pipe: Schedule 40 & 80

Application:

Corrosion resistant pressure pipe, IPS sizes 1/8" through 24", for use at temperatures up to and including 200˚F. Pressure rating (130 psi to 1130 psi) varies with schedule, pipe size, and temperature as shown on page 2 of this specification, and as stated in Harvel Plastics, Inc. engineering bulletin (Product Bulletin 112/401). Generally resistant to most acids, bases, salts, aliphatic solutions, oxidants, and halogens. Chemical resistance data is available and should be referenced for proper material selection. Pipe exhibits excellent flammability characteristics (ULC Listed for Surface Burning Characteristics) and other physical properties. Typical applications include: chemical processing, plating, high purity applications, hot and cold potable water systems, water and wastewater treatment, and other industrial applications involving hot corrosive fluid transfer.

Scope:

This specification outlines minimum manufacturing requirements for Chlorinated Polyvinyl Chloride (CPVC) schedule 40 and 80 iron pipe size (IPS) pressure pipe. This pipe is intended for use in industrial systems where the fluid conveyed does not exceed 200˚F. This pipe meets and or exceeds the industry standards and requirements as set forth by the American Society for Testing and Materials (ASTM) and the National Sanitation Foundation (NSF).

CPVC Materials:

The material used in the manufacture of the pipe shall be a rigid chlorinated polyvinyl chloride (CPVC) compound, Type IV Grade I, with a Cell Classification of 23447 as defined in ASTM D1784. This compound shall be light gray in color, and shall be approved by NSF for use with potable water.

Dimensions:

CPVC Schedule 40 and Schedule 80 pipe shall be manufactured in accordance to the requirements of ASTM F441 for physical dimensions and tolerances. Each production run of pipe manufactured in compliance to this standard, shall also meet the test requirements for materials, workmanship, burst pressure, flattening, and extrusion quality defined in ASTM F441. 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:

Product marking shall meet the requirements of ASTM F 441 and shall include: the manufacturers name (or the manufacturers trademark when privately labeled); the nominal pipe size; the material designation code; the pipe schedule and pressure rating in psi for water @ 73˚F; the ASTM designation F 441; and the independent laboratory's seal of approval for potable water usage. Marking shall also include the flame spread rating and smoke development rating when tested and listed for surface burning characteristics per CAN/ULC S102.2 (Flame Spread (F.S.) of <25 and Smoke Development (S.D.) of <50).

Sample Specification:

All CPVC Schedule 40 and schedule 80 pipe shall be manufactured from a Type IV, Grade I Chlorinated Polyvinyl Chloride (CPVC) compound with a minimum Cell Classification of 23447 per ASTM D1784. The pipe shall be manufactured in strict compliance to ASTM F441, consistently meeting the Quality Assurance test requirements of this standard with regard to material, workmanship, burst pressure, flattening, and extrusion quality. The pipe shall be produced in the USA using domestic materials, by an ISO 9001 certified manufacturer, and shall be stored indoors after production, at the manufacturing site, until shipped from factory. This pipe shall carry the National Sanitation Foundation (NSF) seal of approval for potable water applications. The pipe shall have a Flame Spread rating < 25 and a Smoke Development rating < 50 when tested and listed for Surface Burning Characteristics in accordance with CAN/ULC-S102-2-M88 or equivalent. All pipe shall be manufactured by HARVEL PLASTICS, INC.

CPVC Industrial Pipe: Schedule 40 & 80

Schedule 40 Dimensions

Nom. Pipe Size (in.)	O.D.	Average I.D.	Min. Wall	Nom. Wt./Ft.	Max. W.P
1/4	0.540	0.344	0.088	0.096	780
3/8	0.675	0.473	0.091	0.128	620
1/2	0.840	0.602	0.109	0.190	600
3/4	1.050	0.804	0.113	0.253	480
1	1.315	1.029	0.133	0.371	450
1-1/4	1.660	1.360	0.140	0.502	370
1-1/2	1.900	1.590	0.145	0.599	330
2	2.375	2.047	0.154	0.803	280
2-1/2	2.875	2.445	0.203	1.267	300
3	3.500	3.042	0.216	1.660	260
3-1/2	4.000	3.521	0.226	1.996	240
4	4.500	3.998	0.237	2.363	220
5	5.563	5.016	0.258	2.874	190
6	6.625	6.031	0.280	4.164	180
8	8.625	7.942	0.322	6.268	160
10	10.750	9.976	0.365	8.886	140
12	12.750	11.889	0.406	11.751	130
14	14.000	13.073	0.437	13.916	130
16	16.000	14.940	0.500	18.167	130
18	18.000	16.809	0.562	22.965	130
20	20.000	18.743	0.593	29.976	120
24	24.000	22.544	0.687	37.539	120

Schedule 80 Dimensions

Nom. Pipe Size (in.)	O.D.	Average I.D.	Min. Wall	Nom. Wt./Ft.	Max. W.P.
1/4	0.540	0.282	0.119	0.117	1130
3/8	0.675	0.403	0.126	0.162	920
1/2	0.840	0.526	0.147	0.238	850
3/4	1.050	0.722	0.154	0.322	690
1	1.315	0.936	0.179	0.473	630
1-1/4	1.660	1.255	0.191	0.654	520
1-1/2	1.900	1.476	0.200	0.793	470
2	2.375	1.913	0.218	1.097	400
2-1/2	2.875	2.290	0.276	1.674	420
3	3.500	2.864	0.300	2.242	370
3-1/2	4.000	3.326	0.318	2.735	350
4	4.500	3.786	0.337	3.277	320
5	5.563	4.768	0.375	4.078	290
6	6.625	5.709	0.432	6.258	280
8	8.625	7.565	0.500	9.506	250
10	10.750	9.493	0.593	14.095	230
12	12.750	11.294	0.687	19.392	230
14	14.000	12.410	0.750	23.261	220
16	16.000	14.213	0.843	29.891	220
18	18.000	16.014	0.937	37.419	220
20	20.000	17.814	1.031	45.789	220
24	24.000	21.418	1.218	64.959	210

ASTM STANDARD D1784 MATERIAL EQUIVALENTS:
Cell Classification 23447 = CPVC Type IV Grade I = CPVC 4120

PIPE SIZES SHOWN ARE MANUFACTURED IN STRICT COMPLIANCE WITH ASTM F441

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 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.

EX: 10" CPVC SCH 80
@ 120˚F = ?
230 psi x 0.65 =
149.5 psi max. @ 120˚F

De-Rating Factor

Operating Temp (°F)	De-Rating Factor
73-80	1.00
90	0.91
100	0.82
110	0.72
120	0.65
130	0.57
140	0.50
150	0.42
160	0.40
170	0.29
180	0.25
200	0.20

THE MAXIMUM SERVICE TEMPERATURE FOR CPVC IS 200˚F.

Solvent-cemented joints should be utilized when working at or near maximum temperatures. Harvel Plastics does not recommend the use of CPVC for threaded connections at temperatures above 150˚F; use flanged joints, unions, or roll grooved couplings where disassembly is necessary at elevated temperatures.

Threading of Sch 40 CPVC pipe is not a recommended practice due to insufficient wall thickness. Thread only Sch 80 or heavier walls. **Threading requires a 50% reduction in pressure rating stated for plain end pipe @73˚F.**

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.