

Schedule 40/80 PVC Pipe & Fitting Specifications

 harrisonplastic.com/pvcschedule40-80specs.html

Schedule 40 & Schedule 80 PVC Pipe Specifications

APPLICATION

Corrosion resistant pressure pipe, IPS sizes 1/4" through 24", for use at temperatures up to and including 140°F. Pressure rating (120 psi to 1230 psi) varies with schedule, pipe size, and temperature. 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 physical properties and flammability characteristics. Typical applications include: chemical processing, plating, high purity applications, potable water systems, water and wastewater treatment, drainage, irrigation, agricultural, and other applications involving corrosive fluid transfer.

SCOPE

This specification outlines minimum manufacturing requirements for Polyvinyl Chloride (PVC) Schedule 40 & Schedule 80 iron pipe size (IPS) pressure pipe. This pipe is intended for use in applications where the fluid conveyed does not exceed 140°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 International).

PVC MATERIALS

The material used in the manufacture of the pipe shall be rigid polyvinyl chloride (PVC) compound, Type 1 Grade 1, with a Cell Classification of 12454 as defined in ASTM D1784, trade name designation H707 PVC. This compound shall be white or gray in color as specified, and shall be approved by NSF International for use with potable water (NSF Std 61).

DIMENSIONS

All sizes of PVC Schedule 40 & Schedule 80 pipe shall be manufactured in strict accordance to the requirements of ASTM D1785 for physical dimensions and tolerances. Each production run of pipe manufactured in compliance to this standard, shall also meet or exceed the test requirements for materials, workmanship, burst pressure, 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. All PVC Schedule 80 pipe must also meet the requirements of NSF Standard 14 and CSA Standard B137.3 rigid PVC

pipe for pressure applications, and shall bear the mark of these Listing agencies. This pipe shall have a flame spread rating of 0-25 when tested for surface burning characteristics in accordance with CAN/ULC-S102-2-M88 or equivalent.

[Back to Top](#)

Schedule 40 PVC Pipe Dimensions

PIPE SIZE	O.D.	AVE. I.D.	MIN WALL	NOM. WEIGHT (Wt./ft.)	MAX. W.P. PSI
1/4"	.540	.344	.088	.086	780
3/8"	.675	.473	.091	.115	620
1/2"	.840	.602	.109	.170	590
3/4"	1.050	.804	.113	.226	480
1"	1.315	1.029	.133	.333	450
*1-1/4"	1.660	1.360	.140	.450	370
*1-1/2"	1.900	1.590	.145	.537	330
*2"	2.375	2.047	.154	.720	280
2-1/2"	2.875	2.445	.203	1.136	300
*3"	3.500	3.042	.216	1.488	260
3-1/2"	4.000	3.521	.226	1.789	240
*4"	4.500	3.998	.237	2.118	220
5"	5.563	5.016	.258	2.874	190
*6"	6.625	6.031	.280	3.733	180
*8"	8.625	7.942	.322	5.619	160
*10"	10.750	9.976	.365	7.966	140
*12"	12.750	11.889	.406	10.534	130
*14"	14.000	13.073	.437	12.462	130
*16"	16.000	14.940	.500	16.286	130
*18"	18.000	16.809	.562	20.587	130

*20"	20.000	18.743	.593	24.183	120
*24"	24.000	22.544	.687	33.652	120

Schedule 80 PVC Pipe Dimensions

PIPE SIZE	O.D.	AVE. I.D.	MIN WALL	NOM. WEIGHT (Wt./ft.)	MAX. W.P. PSI
1/4"	.540	.282	.119	.105	1130
3/8"	.675	.403	.126	.146	920
1/2"	.840	.526	.147	.213	850
3/4"	1.050	.722	.154	.289	690
1"	1.315	.936	.179	.424	630
1-1/4"	1.660	1.255	.191	.586	520
1-1/2"	1.900	1.476	.200	.711	470
2"	2.375	1.913	.218	.984	400
2-1/2"	2.875	2.290	.276	1.500	420
3"	3.500	2.864	.300	2.010	370
3-1/2"	4.000	3.326	.318	2.452	350
4"	4.500	3.786	.337	2.938	320
5"	5.563	4.768	.375	4.078	290
6"	6.625	5.709	.432	5.610	280
8"	8.625	7.565	.500	8.522	250
10"	10.750	9.493	.593	12.635	230
12"	12.750	11.294	.687	17.384	230
14"	14.000	12.410	.750	20.852	220
16"	16.000	14.213	.843	26.810	220
18"	18.000	16.014	.937	33.544	220
20"	20.000	17.814	1.031	41.047	220

24"	24.000	21.418	1.218	58.233	210
-----	--------	--------	-------	--------	-----

*Sizes are marked as being in compliance with ASTM D1785 (pressure pipe) and ASTM D2665 (drain, waste & vent pipe--DWV).

Back to Top

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.

OPERATING TEMPERATURE (°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

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.

EXAMPLE: 10" PVC SCHEDULE 80 @ 120°F = ?
230 psi x 0.40 = 92 psi max. @ 120°F

THE MAXIMUM SERVICE TEMPERATURE FOR PVC IS 140°F.

Solvent cemented joints should be utilized when working at or near maximum temperatures.

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

ASTM STANDARD D1784 MATERIAL EQUIVALENTS: Cell Classification 12454 = PVC Type 1 Grade 1 = PVC 1120

Pipe sizes shown are manufactured in strict compliance with ASTM D1785

[Back to Top](#)

General Specifications for Standard Schedule 40 and Schedule 80 PVC Fabricated Drainage Fittings

Scope

This specification is applicable to fabricated fittings, as furnished by Harrison Machine & Plastic Corporation, as they pertain to (PVC) Polyvinyl Chloride Schedule 40 & Schedule 80 fitting configurations.

Materials of Construction

(PVC) Polyvinyl Chloride

Fittings are to be manufactured from PVC material which meets or exceeds the requirements of ASTM D-1784, cell classification 12454B, Type 1, Grade 1.

Pressure pipe used in fabrication must conform to ASTM D-1785 (Schedule 40 & Schedule 80) or ASTM D-2241 (SDR-26 & SDR-41) and listed by the National Sanitation Foundation (NSF) for potable water applications.

Sheet stock material (where used) must conform to ASTM D-1784, cell classification 12454B, Type 1, Grade 1, normal impact, and manufactured without the use of plasticizers or fillers.

Solvent Cement and Welding Rod (PVC)

All solvent cements used, to conform to ASTM D-2564, listed by NSF for potable use applications

Welding rod used in the manufacture of the above fittings, shall conform to ASTM D-1784, cell class 12454B for PVC

Assembly and Construction Procedures

Fittings shall be Butt Fusion (machine) welded where feasible or hand welded (fillet welded) by qualified and experienced craftsman trained in the art of thermoplastic welding and fabrication.

PVC Schedule 40 fittings will be white or gray in color (this color code applies to both pressure and drainage patterns)

Fitting diameters, 18", 20", & 24", as a customer option, may also be constructed from SDR-26 or SDR-41 pipe dependent upon the pressure rating required (i.e. 160 psi or 100 psi).

Dimensional Specifications

All cataloged fittings to be constructed in accordance with Harrison Machine and Plastic Corporation, published drawings. Non-cataloged fittings will be furnished in accordance to or as agreed upon customer specifications.

All female sockets shall have an interference fit with corresponding size pipe. **Refer to Table 2**

Component cut length dimension tolerances of $\pm .500"$

Angle (change of direction tolerances of $\pm 2^\circ$)

Product Quality

All fitting welds (hand and machine) shall be 100% spark tested

Fiberglass reinforced fittings shall be as free as possible from visual defects such as foreign inclusions, air bubbles or delamination

Random inspection performed daily by floor supervisor

TABLE 1

Pertains to pipe stock used in fabrication (fittings are not pressure rated)

Maximum Working Pressure (psi) @ 73°F

Size	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
SDR-41	100	100	100	100	100	100	100	100	100	100
SDR-26	160	160	160	160	160	160	160	160	160	160
Sch 40	220	180	160	140	130	130	130	130	130	130
Sch 80	320	280	250	230	230	220	220	220	220	220

TABLE 2

Tapered Belled/Socket Dimensions for PVC & CPVC Schedule 40 & Schedule 80 Fittings

Nominal Pipe Size	Socket Entrance		Socket Bottom		Socket Depth	
	I.D. Minimum	I.D. Maximum	I.D. Minimum	I.D. Maximum	Schedule 40	Schedule 80
4"	4.509"	4.527"	4.482"	4.500"	1.875"	1.875"
6"	6.636"	6.658"	6.603"	6.625"	3.000"	3.000"
8"	8.640"	8.670"	8.595"	8.625"	4.000"	4.000"
10"	10.761"	10.791"	10.722"	10.752"	5.000"	5.000"
12"	12.763"	12.793"	12.721"	12.751"	6.000"	6.000"
14"	14.030"	14.045"	13.985"	14.000"	7.000"	7.000"
16"	16.037"	16.052"	15.985"	16.000"	8.000"	8.000"
18"	18.041"	18.056"	17.985"	18.000"	9.000"	9.000"
20"	20.045"	20.060"	19.985"	20.000"	10.000"	10.000"
24"	24.060"	24.075"	24.000"	24.015"	12.000"	12.000"

[Back to Top](#)

General Specifications for Standard Schedule 40 & Schedule 80 PVC Fabricated Pressure Fittings

Scope

This specification is applicable to fabricated fittings, as furnished by Harrison Machine & Plastic Corporation, as they pertain to (PVC) Polyvinyl Chloride Schedule 40 & Schedule 80 fitting configurations.

Materials of Construction

(PVC) Polyvinyl Chloride

Fittings are to be manufactured from PVC material which needs or exceeds the requirements of ASTM D-1784, cell classification 12454B, Type 1, Grade 1.

Pressure pipe used in fabrication must conform to ASTM D-1785 (Schedule 40/80) or ASTM D-2241 (SDR-26/41) and listed by the National Sanitation Foundation (NSF) for potable water applications.

Sheet stock material (where used) must conform to ASTM D-1784, cell classification 12454B, Type 1, Grade 1, normal impact, manufactured without the use of plasticizers or fillers.

Solvent Cement and Welding Rod (PVC)

All solvent cements used, conform to ASTM D-2564, listed by NSF for potable use applications.

Welding rod used in the manufacture of the above fittings, shall conform to ASTM D-1784, cell class 12454B for PVC, and shall be of a material compatible with the corresponding pipe/sheet stock.

Assembly/Construction Procedures

Fittings shall be Butt Fusion (machine) welded where feasible or hand welded (fillet welded) by qualified and experienced craftsman trained in the art of thermoplastic welding and fabrication.

All pressure fittings, with the exception of formed elbows, couplings, reducer couplings and reducer bushings will be 100% fiberglass reinforced with multiple layers or mat and resin to increase the base pressure rating of the fitting to meet or exceed the desired performance pressure rating of the corresponding diameter and wall Schedule of pipe. **Refer to Table 1.**

PVC Schedule 40 fittings will be white in color, while PVC Schedule 80 fittings will be dark gray in color. This color code applies to both pressure and drainage patterns.

Fitting diameters, 18", 20", & 24" as a customer option, may also be constructed from SDR-26 or SDR-41 pipe dependent upon the pressure rating required (i.e. 160 psi or 100 psi).

Dimensional Specifications

All cataloged fittings to be furnished in accordance with Harrison Machine and Plastic Corporation, published drawings. Non-cataloged fittings will be furnished in accordance to or as agreed upon customer specifications.

All female sockets shall have an interference fit with corresponding size pipe. **Refer to Table 2**

Component cut length tolerances of $\pm .500$ ".

Angle (change of direction) tolerances of $\pm 2^\circ$.

Product Quality

All fitting welds (hand and machine) shall be 100% spark tested

Fiberglass reinforced fittings shall be as free as possible from visual defects such as foreign inclusions, air bubbles or delamination

Random inspection performed daily by floor supervisor

TABLE 1

Pertains to pipe stock used in fabrication (fittings are not pressure rated)										
Maximum Working Pressure (psi) @ 73°F										
Size	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
SDR-41	100	100	100	100	100	100	100	100	100	100
SDR-26	160	160	160	160	160	160	160	160	160	160
Sch 40	220	180	160	140	130	130	130	130	130	130
Sch 80	320	280	250	230	230	220	220	220	220	220

TABLE 2

Tapered Belled/Socket Dimensions for PVC & CPVC Schedule 40 & Schedule 80 Fittings

Nominal Pipe Size	Socket Entrance		Socket Bottom		Socket Depth	
	I.D. Minimum	I.D. Maximum	I.D. Minimum	I.D. Maximum	Schedule 40	Schedule 80
4"	4.509"	4.527"	4.482"	4.500"	1.875"	1.875"
6"	6.636"	6.658"	6.603"	6.625"	3.000"	3.000"
8"	8.640"	8.670"	8.595"	8.625"	4.000"	4.000"
10"	10.761"	10.791"	10.722"	10.752"	5.000"	5.000"
12"	12.763"	12.793"	12.721"	12.751"	6.000"	6.000"
14"	14.030"	14.045"	13.985"	14.000"	7.000"	7.000"
16"	16.037"	16.052"	15.985"	16.000"	8.000"	8.000"
18"	18.041"	18.056"	17.985"	18.000"	9.000"	9.000"
4"	20.045"	20.060"	19.985"	20.000"	10.000"	10.000"
24"	24.060"	24.075"	24.000"	24.015"	12.000"	12.000"

[Back to Top](#)

Solvent Cement Joining Recommendations (Large Diameter PVC Joints)

These guidelines specifically address recommended procedures required in successfully making solvent weld joints for large diameter systems (i.e. 8" through 24"). Solvent cemented joints represent the final important steps in making the system either a success or a failure. It is important that these instructions are carefully followed.

Important to all successful solvent weld joints there are "FOUR" important ingredients:

1. It is essential that surfaces to be cemented are clean and free of foreign material. If permitted to remain, grease, oil, ink, etc. can interfere with the solvent cementing process and reduce the strength of the bond.
2. Joining surfaces (pipe & fitting) must be dissolved and made soft.
3. Sufficient cement must be applied to fill gaps between pipe & fitting.
4. Assembly of pipe & fitting must be made while the surfaces are both wet and fluid

Large diameter joints are very similar to those for smaller diameters, in that both have tapered sockets. Tapered sockets have the capability of providing a fused joint at the socket bottom and a bonded joint at the top of the socket, resulting in a quality seal particularly in pressure applications. Tapered sockets, however, also result in a situation where the pipe will tend to "push-out" immediately after the pipe is inserted into the fitting socket. Care must be taken to hold the pipe in place until the cement begins to set.

As with any solvent cemented joints, the pipe must be cut square and cleaned. Large diameter PVC pipe may be cut with a skill-saw and a carbide tipped blade. A circular blade with 20 or less teeth is preferred over a finer blade which tends to heat the PVC material as it cuts, resulting in a molten PVC residue producing a rough cut. The use of a "pipe-belt" is recommended to ensure a straight cut.

After the pipe is cut to length, the outside and inside edges are to be deburred. This can be easily achieved by scraping these edges with a sharp edged piece of steel (i.e. file). This is a relatively easy step and only takes a few moments, but is a critical step.

Two or more pipe fitters are strongly recommended when making large diameter joints due to the bulk and weight of the system as well as the need to apply cement and primer as quickly as possible.

Align the pipe & fitting as close to its final position as possible. Elevate both the pipe & fitting so that the entire circumference is accessible.

Mechanical devices, such as come-alongs, are strongly recommended to pull the pipe into the fitting socket. The use of chains to "grasp" the pipe is an option but they may also slip. Sufficient cable or chain, enough to run the entire length of 20 foot joint(s) of pipe, must be laid out on either side of the joint, prior to assembly. Additional cable must be added in order to secure it to a 4x4 block, extending approximately 1 foot beyond the pipe on side. Cumbersome as it might appear, this method offers a more positive pull than other methods.

(Note: A chain sling may be used on the fittings providing it results in a "straight" pull.)

At this point, available manpower working in unison, is used to keep all components in place. Be sure the pipe & fitting are free to travel the required distance to seat at the fitting socket bottom. Mark the depth of the socket on the pipe, plus six inches, as an indication of pipe insertion depth. The two cable come-alongs are immediately hooked up at 3:00 and 9:00, so that after application of primer and solvent the joint may be pulled together.

When the chains (cables) are in place joint preparation now takes place.

PC-64 Primer-Cleaner, clean pipe and fitting surfaces with a cotton rag to remove any moisture and excessive dirt.

After properly cleaning pipe surfaces, using PC-64 Primer-Cleaner and a 3" to 4" wide brush, liberally apply the primer so that it flows on to and soaks into the plastic, resulting in a softening of the surfaces for maximum weldability. The primer should be applied to the pipe ends and to an area equal to the corresponding fitting socket depth plus approximately 4 inches. The primer will remove the glossy surface, dirt and surface printing. A properly primed surface will have a uniform dull surface which will begin to soften.

Prime the fitting socket in the same manner as described above. A second coating of primer may then be needed on the pipe to assure wet surfaces

Using Gray Medium-Body Cement, liberally apply the solvent, again using a 3" to 4" brush, to both the fitting socket and pipe surface. Do not overbrush the solvent. When done properly, very little of the surface areas, to be joined should be visible. A thick even coat is needed to fill the gap between pipe & fitting.

Note: It may be advisable to pour the primer and solvent into larger "wide-mouth" containers, prior to use to accommodate the 3" to 4" brushes.

Important: It is advisable to utilize two or more pipe fitters. One will apply primer/solvent to the fitting socket and the other to the pipe surface, simultaneously and quickly. The joint surfaces must be fluid when making the joint.

Using the come-along, pull joint together, drawing the pipe into the fitting socket until the pipe has reached the fitting stop (socket bottom). Observe the previously measured pipe markings to ensure pipe that the pipe is seated. At this point, the cement will ooze toward the bottom of the pipe and fill a small section inside the fitting. Remove as much visible excess cement as can be reached. One very large diameter systems, **"Do not venture inside the system to inspect the joint or to clean the solvent. The fumes can be dangerous."**

Any excess solvent on the outside of the joint should also be removed, to avoid puddling and for appearance.

Continue come-along pressure, holding the pipe into the fitting socket for approximately 15 minutes (or until the solvent begins to set-up), to prevent the pipe from "pushing-out".

Pressure test the system only after the joints have cured. Refer to curing schedules as defined by the solvent manufacturer which are primarily dependent upon temperature.

The above are recommendations only. Site conditions vary greatly. Harrison Machine & Plastic Corporation cannot be held responsible for results.

Equipment Needed for Installation/Assembly

Tape Measure	Pipe Belt	File	Clean Cotton Rags
Come-Alongs	Primer	Patience	Pencil
Saw & Circular Blade		Cement	Cleaner
Buckets	3" to 4" Brushes		