



LabWaste™ CPVC Technical Information & Installation Guide

Typical Physical Properties of Spears® LabWaste™ CPVC Material

Property	Test Method	Typical Value
Mechanical Properties @ 73°F		
Specific Gravity		1.49
Tensile Strength, psi	ASTM D 792	9000
Tensile Modulus, psi	ASTM D 638	420,000
Flexural Strength	ASTM D 638	12,000
Izod Impact (notched @73°F)	ASTM D 790	
Fittings	ASTM D 256	3.0
Pipe		5.5
Thermal Properties		
Heat Deflection Temperature 264 psi	ASTM D 648	
Fitting		214°F
Pipe		230°F
Thermal Conductivity, BTU/hr/sq ft/°F/in	ASTM C 177	.95
Coefficient of Linear Expansion, in/in/°F	ASTM D 696	3.2 x 10 ⁻⁵
Flammability		
Limiting Oxygen Index	ASTM D 2863	60
UL 94 Rating		
	UL 94	V-0, 5VB
Flame & Smoke Rating¹		
Flame Spread	CAN/ULC S 102.2	<25
Smoke Developed	UL 723/ASTM E 84	<50
Solvent Cement		
	ASTM F 2618/ASTM F 493	Heavy Body; Mustard Yellow Color

Typical Physical Properties data is based on information from material suppliers. It is provided as a guideline for service and is not to be considered a warranty of performance.

1- Based on test of physical product, including solvent cement welded pipe and fittings assemblies, as opposed to test of material only.

Fire Resistance

Material used in Spears® **LabWaste™** CPVC systems has a UL 94 flammability rating of V-0, 5VB. Pipe and fittings have been Listed and rated based on **finished product** tests, as opposed to a material test only, for surface burning characteristics of flame spread and smoke density developed by Underwriters Laboratories of Canada under standard test method CAN/ULC S102.2-M88. Additional test of **LabWaste™** pipe with dry fit caps was conducted by Southwest Research Institute (SwRI) Department of Fire Technology under UL 723/ASTM E 84 (modified to test finished product). Pipe and fitting components ratings are below the 25 maximum flame spread and 50 maximum smoke density developed typically required for exposed air plenum installation. Check local codes for acceptability. Use of approved plenum wrap or transition connectors to other material may be used if required.

Pipe & Fittings

Spears® **LabWaste™** CPVC pipe and fittings are produced to the dimensional and performance requirements of ASTM F 2618, **Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Fittings for Chemical Waste Drainage Systems**. **LabWaste™** CPVC fitting configurations are produced to applicable DWV patterns of ASTM D 3311, **Standard Specification for Drain, Waste, and Vent (DWV) Plastic Fittings Patterns**, plus various specialty patterns and manufactured specified configurations not included in D 3311. All drainage fittings with 90° angles (sanitary tees, elbows, etc.) have socket pitch to maintain approximately 1/4" per foot drainage. **LabWaste™** CPVC pipe is produced to dimensions specified in ASTM F 2618 with sizes greater than 12" produced to Schedule 40 dimensions of ASTM F 441, **Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedule 40 and 80**.

Schedule 40 CPVC Pipe Dimensions (inch)

Pipe Diameter	1-1/2	2	3	4	6	8	10	12	14	16	18	20	24
Avg. O.D.	1.900	2.375	3.500	4.500	6.625	8.625	10.750	12.750	14.000	16.000	18.000	20.000	24.000
Avg. I.D.	1.592	2.049	3.042	3.998	6.031	7.943	9.976	11.889	13.073	14.940	16.809	18.743	22.544
Min. Wall	.145	.154	.216	.237	.280	.322	.365	.406	.437	.500	.562	.593	.687

Expansion & Contraction

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Spears® **LabWaste**™ CPVC products, like all piping materials, expand and contract with changes in temperature. If the coefficient of linear expansion is 3.2×10^{-5} in./in. °F, a 25°F change in temperature will cause an expansion of 1 inch for a 100-foot straight length. For most operating and installation conditions, expansion and contraction can be accommodated at changes of direction, or simple expansion loops can be used. For underground installations, snaking the pipe in the trench can be used where necessary to accommodate expansion and contraction.

Thermal expansion change in length is calculated from Length of Run in feet, expected Change in Temperature and given Coefficient of Linear Thermal Expansion of 3.2×10^{-5} in./in. °F for CPVC:

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

Where:

$$e = 3.2 \times 10^{-5} \text{ in./in. } ^\circ\text{F}$$

L = Length of Run in feet

ΔT = Temperature Change in °F

Example:

How much will a 50 ft. run Spears® **LabWaste**™ pipe expand if the expected ambient temperature will range from 45°F to 85°F?

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

$$\Delta L = 12 \times .000032 \times 50 \times 40$$

$$\Delta L = .768 \text{ inches}$$

The following table provides quick reference in identifying expansion length change for different run lengths of pipe at various anticipated temperature changes.

Thermal Expansion Table

Length of Run (L) in feet	Length Change in Inches (ΔL) for Specified Change in Temperature (ΔT)								
	20°F	30°F	40°F	50°F	60°F	70°F	80°F	90°F	100°F
10	.08	.12	.15	.19	.23	.27	.31	.35	.38
20	.15	.23	.31	.38	.46	.54	.61	.69	.77
40	.31	.46	.61	.77	.92	1.08	1.23	1.38	1.54
50	.38	.58	.77	.96	1.15	1.34	1.54	1.73	1.92
70	.54	.81	1.08	1.34	1.61	1.88	2.15	2.42	2.69
90	.69	1.04	1.38	1.73	2.07	2.42	2.76	3.11	3.46
120	.92	1.38	1.84	2.30	2.76	3.23	3.69	4.15	4.61

Joining Methods

Spears® **LabWaste**™ CPVC pipe and fittings are easily joined using Spears® LW-5 One-Step Solvent Cement that has been specially formulated for corrosive/acid waste applications and manufactured in accordance with ASTM F 493, **Standard Specification for Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings**, as specified in ASTM F 2618. When cured, this cement provides a fused joint that maintains the same physical and chemical resistance properties as the CPVC components in the system. Spears® LW-5 is a "one-step" cement and does not require the use of primer. Spears® **LabWaste**™ CPVC systems may be additionally joined using threaded (NPT) or flanged connections where removal or connection to supplementary equipment is required. Special transition couplings are available for joining to Polypropylene, PVDF, glass or Duriron systems.

Solvent Cement Joints – Store below 90°F (33°C). Stir and use as is. If jelled, replace. Use within 2 years of date stamped on can. This cement is designed for use without a Primer. Check local code requirements before using Spears® LW - 5 cement.

1. Cut pipe square, deburr and chamfer (bevel 10° to 15°). Clean and dry joining surfaces.
2. Check dry fit. For interference fit, pipe should push 1/4 to 3/4 way into fitting snugly.
3. Use a suitable applicator at least 1/2 size of pipe diameter; for larger sizes use brush or roller.
4. Apply a full even layer of cement on the pipe equal to the socket depth. Coat the fitting socket with a medium layer. Avoid excess and puddling. If necessary, apply a second full layer on pipe.



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- Assemble while cement is wet. If not wet, recoat all parts before assembly. Assure pipe bottoms into fitting socket using a 1/8 to 1/4 turns twist. To avoid push out and allow for initial set, hold for about 30 seconds. Wipe off excess. Handle newly assembled joints carefully.

An Initial Set time is recommended to provide good handling strength after which the joint will handle normal stresses of installation. Cure Time is the recommended waiting period prior to placing the joint into service and before any pressure testing of the system. Set and cure times are relative to temperature at time of installation. Best results are obtained at temperatures between 40° and 110°F. Due to the many field variables, these should be used as a general guide only.

Recommended Set & Cure Times

Temperature	Initial Set	Cure
60°F - 100°F	30 min.	1 hr.
40°F - 60°F	1 hr.	2 hrs.
0°F	2 hrs.	4 hrs.

In moist or humid conditions (relative humidity above 60%) allow 50% more cure time.

Average Number of Joints per Quart of LW-5 One-step Cement

Pipe Diameter	1-1/2	2	3	4	6	8	10	12	14	16
No. of Joints	90	60	40	30	10	5	2-3	1-2	3/4	1/2-3/4

Estimate based on laboratory tests. Due to many field variables, these figures should be used as a general guide only.

Threaded Joints - Spears® Manufacturing Company highly recommends the use of Spears® **BLUE 75™** thread sealant, which has been tested for compatibility with Spears® products. Please follow the sealant Manufacturer's Application/Installation instructions. Choice of another appropriate thread sealant is at the discretion of the installer.

WARNING: Some pipe joint compounds or pastes may contain substances that could cause stress cracks in CPVC. For transitions to metal threaded systems, all cutting oils must be removed and the metal pipe thoroughly flushed and degreased prior to assembly with CPVC systems.

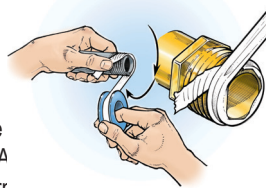
- Apply joint sealant to the male pipe threads ONLY.
- Thread joint hand tight for initial assembly.
- Using commercial strap wrenches tighten 1 to 2 turns beyond hand tight; avoid over tightening. **DO NOT** use conventional pipe wrenches that can damage plastic fittings.

If a tape sealant is used:

- Use TFE tape no less than 25 mil thick.
- Initial wrap must fully cover the thread end.
- Wrap clockwise with standard pipe threads.
- Use only 2-3 wraps of tape.

DO NOT use combination of paste and tape sealants.

Flanged Connections - Solvent cement flange hub to pipe material suitable for the intended application having a Shore "A" 60. Use of well lubricated bolts and flat washers is required. Bolts must be tightened in a 180° opposing pattern to the recommended torque values.



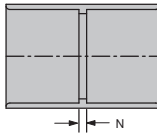
Use full faced, 1/8" thick gaskets of a 60. Use of well lubricated bolts and flat washers

Flange Size (in.)	Bolt Torque (ft.-lb.)	Torque Sequence
1-1/2	12	
2-4	25	
6-8	40	
10	64	
12	95	
14-16	110	

LabWaste™ Transitions To Other Systems – Spears® **LabWaste™** Corrosive Waste Drainage System provides a complete line of transition fittings for use with other corrosive waste piping materials for system additions and retrofits.

P100 Coupling

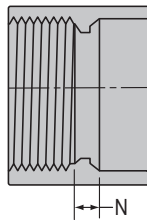
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Part Number	Size	N
P100-015C	1-1/2	1/8
P100-020C	2	1/8
P100-030C	3	3/16
P100-040C	4	1/4
P100-060C	6	1/4
P100-080C	8	1/4
P100-100C	10	3/8
P100-120C	12	3/8
P100-140C	14	3/8

P101 Female Adapter

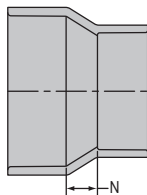
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Part Number	Size	N
P101-015C	1-1/2	1/4
P101-020C	2	1/4
P101-030C	3	5/16
P101-040C	4	3/8
P101-060C	6	15/32

P102 Increaser Reducer

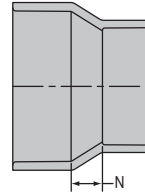
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Part Number	Size	N
P102-251C	2x1-1/2	11/16
P102-337C	3x1-1/2	1-3/32
P102-338C	3x2	15/16
P102-420C	4x2	1-3/4
P102-422C	4x3	15/16
P102-530C	6x3	1-15/16
P102-532C	6x4	1-7/16
P102-582C	8x4	2-11/32
P102-585C	8x6	1-11/32

P102 Increaser Reducer

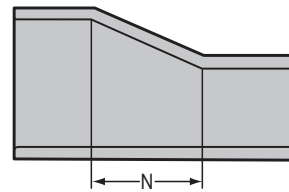
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Part Number	Size	N
P102-624C	10x4	3-3/8
P102-626C	10x6	2-3/16
P102-628C	10x8	1-9/32
P102-666C	12x6	3-9/32
P102-668C	12x8	2-1/4

Pipe Increaser - Eccentric Reducer

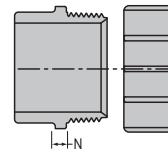
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Part Number	Size	N
P102-338EC	3x2	2-15/32

P103P Trap Adapter - Male

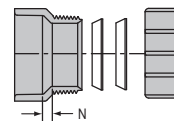
Spig x Slip with Plastic Nut



Part Number	Size	N
P103P-015C	1-1/2	3/16
P103P-020C	2	3/16

P104R Trap Adapter - Female w/1-1/2 Plastic Nut & Washer and 1-1/2x1-1/4 Washer

H x Slip w/Plastic Nut



Part Number	Size	N
P104R-015C	1-1/2	3/16