



Fabrication Capabilities



ENGINEERING GUIDE

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Manifolds Custom Fittings Offset Connectors



Custom Component Fabrication For Virtually Any Piping System Need!

Spears® has the capability to build custom piping system components to virtually any specifications for either pressure or nonpressure applications. Spears® experience in piping system component fabrications provides the highest quality and technology available for a variety of industry needs including Agriculture, Turf Irrigation, Water Parks, Aquariums, Pulp & Paper, Industrial and Chemical Processing.

Up to 48" Nominal Diameter Fabrication

Spears® forming capabilities can handle some of the largest thermoplastic piping component custom fabrication needs.

Pressure & Non-Pressure Applications

Produced primarily from thermoplastic pipe and piping system components, custom products can be fabricated for a variety of pressure applications based on design criteria and material selection from a variety of Schedule, Class and SDR ratings.

Superior FRP Bonding Technology

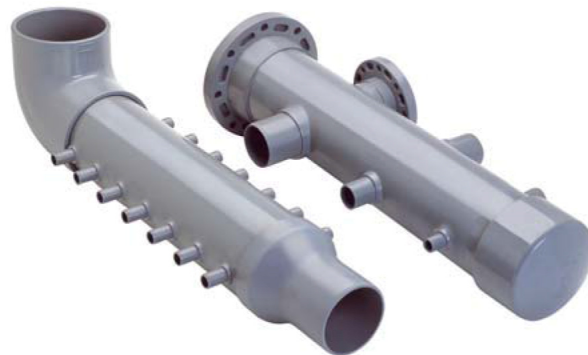
Spears® research in Fiberglass Reinforced Plastic (FRP) technology has developed superior bonding of fiberglass resin to PVC and CPVC thermoplastic materials. This eliminates weaker, "egg shell" reinforcement typical in many competitor FRP products.

High Quality Joining & Welding

From basic solvent cement welding to precision Hot-Air welds, Spears® controlled quality fabrication gives the highest assurance of sound, reliable construction.

Muti-Outlet Manifolding

Spears® specializes in multi-outlet manifolds built to specifications for a wide variety of inlet, outlet and reductions in socket, flanged, or threaded connections.





**Fabricated Fittings Technical
Special Fabrication Overview**

Spears® Offers A Wide Variety of Cataloged PVC & CPVC Piping System Components Which Can Be Custom Fabricated to Almost Any User Specification Or Need . . .

Pressure Fitting - Schedule 40 & Schedule 80, CPVC up to 12", PVC up to 36" and higher!

Low Pressure Fittings - 130 psi Schedule 40 & Schedule 80 through 16"

100 psi Schedule 40 & Schedule 80 14" through 24"

DWV Fittings - ASTM F1866 Schedule 40 & Schedule 80 through 24"

Fabricated Flanges - IPS & PIP sizes, ANSI Class 125/150 or any specified Bolt Pattern

Duct Fittings - PVC & CPVC Fittings plus, Blast Gates, Rain Caps and Dampers through 24"

IPS Class Fittings - PVC Class 63, 125, 160 & 200 Socket & Gasketed through 24"

PIP Fittings - PVC 80#, 100#, 125# Socket & Gasketed through 24"

Low Head PIP - PVC Fittings, Vent & Gate Risers, Flanges

Virtually Endless Variety of Configurations . . .

Elbows	Wyes	Eccentric Reducers	Flanged
Tees	Double Wyes	Couplings	Threaded
Sanitary Tees	Combo Wyes	Gasketed	IPS x PIP
Bushings	Reducers	Socketed	Metric

Plus, Spears® Offers a Full Line of Injection Molded PVC, CPVC, & Polypropylene Fittings Valves & Accessories To Compliment Any Custom Fabrication Project . . .

Schedule 40 Fittings	Ball Check Valves	Y-Strainers	Large Butterfly Valves
Schedule 80 Fittings	Swing Check Valves	Basket Strainers	Valve Actuation
Ball Valves	Diaphragm Valves	Butterfly Valves	And Many More!

Quality Custom Fabrication For Today's Growing Industry Applications . . .

Industrial	Chemical	Mining	Municipal Water
Waste Water	Pulp & Paper	Plating	Cooling Systems
Water Parks	Aquariums	Agriculture	Turf Irrigation
Pharmaceutical	Food Processing	Air Handling	Chemical Waste

Fabricated Fittings Technical
General Specifications For Standard Fabrication Fittings



In view of limited industry standards for fabricated fittings, a conscientious supplier should use due caution in selecting a fabricated fitting supplier. Considerable variations in product quality assurance and performance levels may exist with other manufacturers and similar products. Comparison of performance criteria should be evaluated in accordance with accepted industry and engineering practices. .

1.0 Scope

1.1 This general specification covers fittings fabricated from PVC or CPVC pipe for both pressure rated and drainage, waste and vent (DWV) applications. Included are general requirements for materials, dimensions, structural conformance, pressure ratings, testing and workmanship. Additional requirements may be found in applicable referenced specifications.

2.0 Applicable Specifications & Referenced Documents

- 2.1 American Society for Testing and Materials (ASTM)
 - D 1599 Test Method for Short-Term Hydraulic Failure Pressure of Plastic Pipe, Tubing and Fittings.
 - D 1784 Specification for Rigid Poly (Vinyl Chloride) (PVC) Compound and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
 - D 1785 Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedule 40, 80 and 120
 - D 2241 Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
 - D 2466 Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
 - D 2467 Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
 - D 2563 Standard Practice for Classifying Visual Defects in Glass-Reinforced Plastic Laminate Parts
 - D 2564 Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems
 - D 2665 Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste and Vent Pipe and Fittings
 - F 441 Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedule 40 & 80
 - F 442 Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)
 - F 477 Specification for Elastomeric Seals (Gaskets for Joining Plastic Pipe
 - F 1498 Specification for Tapered Pipe Threads 60° for Thermoplastic Pipe and Fittings
 - F 1866 Specification for Poly (Vinyl Chloride) (PVC) Plastic Schedule 40 Drainage and DWV Fabricated Fittings
- 2.2 Canadian Standards Association (CAN/CSA) B181.2 PVC Drain, Waste and Vent Pipe and Pipe Fittings

3.0 Basic Materials

- 3.1 Pipe - Fittings shall be fabricated from pipe stock certified by the National Sanitation Foundation (NSF®) for use with potable water and in conformance with all applicable ASTM Specifications.
- 3.2 Solvent Cements - solvent cements shall be certified by NSF® for use with potable water and in conformance with ASTM Specification D 2564.
- 3.3 Injection Molded Components - molded components used in fitting fabrication shall be certified by NSF® for use with potable water and in conformance with applicable ASTM Specifications.
- 3.4 Gaskets - gaskets shall be in conformance with ASTM Specification F 477.

4.0 General Performance Specifications

- 4.1 All fabricated fittings shall meet or exceed the applicable performance criterial list below
 - 1. Dimensional Conformance
 - a. All sockets shall have an interference fit with applicable pipe.
 - b. All change-of-direction fittings shall not exceed $\pm 1^\circ$ variance in the specified angle.
 - c. All standard stock fittings shall have specified cut lengths for all components in order to maintain dimensional consistence. Maximum overall deviations shall not exceed $\pm \frac{1}{2}$ " for fittings to 12", ± 1 " for sizes 14" & larger and all wyes.
 - 2. Structural Conformance
 - a. Burst Pressure - representative sample of fittings shall be tested to a minimum of two times the applicable maximum internal pressure rating in accordance with ASTM D 1599.
 - b. Fabricated fittings shall meet the applicable requirements of the following Quality Assurance testing in accordance with the designated Standard Test Method.

TEST	STANDARD TEST METHOD
Burst Test	ASTM D 1599
Lap Shear Test	CAN/CSA B181.2
Joint Delamination	Spears® Test
Air-Gap Spark Test	Spears® Test
Fusion Bond Tensile Test	CAN/CSA B181.2
Fusion Bond Deflection	CAN/CSA B181.2
Branch Deflection Test (Bending)	CAN/CSA B181.2/ ASTM F 1866
 - c. All DWV and Low Pressure fittings shall additionally meet the requirements of ASTM F 1866 and the applicable portions of CAN/CSA B181.2.



Fabricated Fittings Technical
General Specifications For Standard Fabrication Fittings

- d. Fittings designed for use at pressures in excess of 130 psi may be reinforced where reinforcement has been deemed necessary for proper fitting performance.
- e. Fiberglass reinforced fittings shall be free of visible chips, cracks, foreign inclusions, air bubbles, lack of fill-out, delamination and sharp obtrusive surfaces as defined in ASTM D 2563.

5.0 Product Labeling

- 5.1 Fittings or product packaging shall be labeled with the manufacturer's name, part number, size, description, product code and ASTM Specification Number, if applicable.

6.0 Pressure Rating of Spears® Fabricated Fittings

- 6.1 Spears® fabricated fittings are rated to the following maximum internal pressures for water at 73°F.
- 6.2 Schedule 40 & Schedule 80 Pressure Fittings

NOMINAL SIZE	SCHEDULE 40 PSI RATING	SCHEDULE 80 PSI RATING
2"	280	400
3"	260	370
4"	220	320
5"	190	290
6"	180	280
8"	160	250
10"	140	230
12"	130	230
14"	130	220
16"	130	220
18"	130	220
20"	120	220
24"	120	220

6.3 SDR Series Pressure Fittings (IPS & PIP Sizes)

SDR	COMMON REFERENCE	PSI RATING
21	Class 200 IPS	200
26	Class 160 IPS	160
32.5	Class 125 IPS / 125# PIP	125
41	Class 100 IPS / 100# PIP	100
51	80# PIP	80
64	Class 63 IPS	63

6.4 Ratings for Special Fabricated Fitting Configurations

TYPE	PSI RATING
Saddles	NPR
Duct Fittings	NPR
Duct Fittings	NPR
Wye, Combo Wye, Double Wye, Sanitary Tee (DWV)	NPR
Wye, Sanitary Tee (reinforced)	100
Schedule 40 & 80 Low Pressure (thru 12")	130
Schedule 40 & 80 Low Pressure (14" thru 24")	100
50 & 100 ft. Head (Low Head)	43
IPS Flange (Steel Ring)	150
IPS Flange (Plastic Ring)	50
PIP Flange 6" - 16" (Plastic Ring)	125
PIP Flange 14" - 24" (Steel Ring)	125
Blind Flange 14" - 24"	50

Note: NPR = Non Pressure Rated
 Custom fabricated fittings and manifolds are manufactured to user specification and may not meet the above specified requirements.

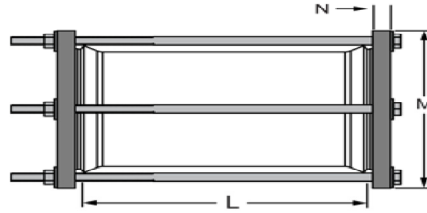
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Fabricated Fittings Technical
Bolted Compression Couplings - PIP



**Bolted Compression Coupling -
 12" Length**

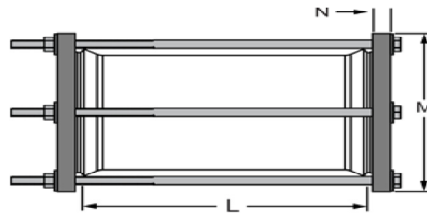
Bolted Compression x Bolted Compression



Part Number		Size	L	M	N	Approx. Wt. (Lbs.)
ZINC	SS316					
3028B-060X12	3028B-060X12S	6	12	9	5/16	9.36
3028B-080X12	3028B-080X12S	8	12	11	5/16	10.51
3028B-100X12	3028B-100X12S	10	12	13-1/8	3/8	16.29
3028B-120X12	3028B-120X12S	12	12	15-1/4	3/8	20.07
3028B-150X12	3028B-150X12S	15	12	18-5/8	3/8	28.41

**Bolted Compression Coupling -
 18" Length**

Bolted Compression x Bolted Compression

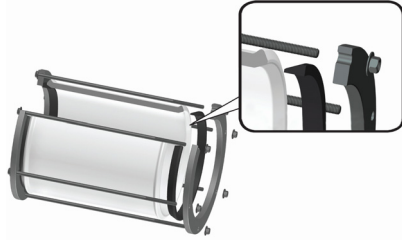


Part Number		Size	L	M	N	Approx. Wt. (Lbs.)
ZINC	SS316					
3028B-060X18	3028B-060X18S	6	18	11	5/16	9.71
3028B-080X18	3028B-080X18S	8	18	11	5/16	13.90
3028B-100X18	3028B-100X18S	10	18	13-1/8	3/8	18.61
3028B-120X18	3028B-120X18S	12	18	15-1/4	3/8	27.09
3028B-150X18	3028B-150X18S	15	18	18-5/8	3/8	36.89

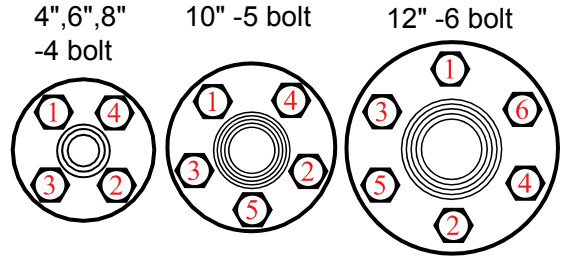


Fabricated Fittings Technical
Bolted Compression Couplings - IPS

Zinc Plated Bolt Pack w/ Galvanized Flanges or
 Stainless Steel Bolt Pack w/ Stainless Flanges



Bolt Tightening Sequence
 Recommended Torque to Seal: 12-15 ft-lb



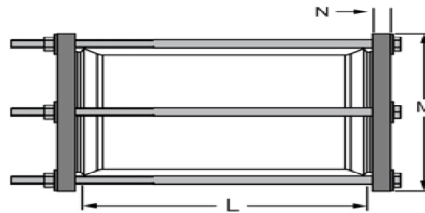
IPS/ SCH 40
 130 psi rated

SBR Gasket
 (BUNA-S)

4" - 12" diameter
 12" or 18" length

**Bolted Compression Coupling -
 12" Length**

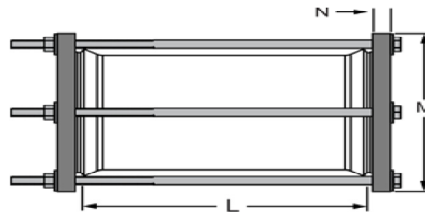
Bolted Compression x Bolted Compression



Part Number		Size	L	M	N	Approx. Wt. (Lbs.)
ZINC	SS316					
3728B-040X12	3728B-040X12S	4	12	7-5/8	5/16	11.34
3728B-060X12	3728B-060X12S	6	12	9-7/8	5/16	15.74
3728B-080X12	3728B-080X12S	8	12	11-7/8	3/8	21.25
3728B-100X12	3728B-100X12S	10	12	14	3/8	19.63
3728B-120X12	3728B-120X12S	12	12	16-1/8	3/8	24.44

**Bolted Compression Coupling -
 18" Length**

Bolted Compression x Bolted Compression



Part Number		Size	L	M	N	Approx. Wt. (Lbs.)
ZINC	SS316					
3728B-040X18	3728B-040X18S	4	18	7-5/8	5/16	10.41
3728B-060X18	3728B-060X18S	6	18	9-7/8	5/16	14.90
3728B-080X18	3728B-080X18S	8	18	11-7/8	3/8	18.94
3728B-100X18	3728B-100X18S	10	18	14	3/8	25.44
3728B-120X18	3728B-120X18S	12	18	16-1/8	3/8	31.49