CHARLOTTE PIPE AND FOUNDRY COMPANY®

You can't beat the system.®

Submittal Package FlowGuard Gold® CPVC CTS System

(October 20, 2023)

Table of Contents for FlowGuard Gold® CPVC CTS Submittal Package

Page

Submittal Form For FlowGuardGold CPVC CTS System 3

Product Certifications 4

Plenum Rating ASTM E84 5

Pressure/Temperature Ratings 6-7

Solvent Cements 8-9

FlowGuardGold CPVC CTS Pipe 10

FlowGuardGold CPVC CTS Fittings 11-14

Chemical Compatibility 15-18
Link to System Compatible Product site:
https://www.lubrizol.com/CPVC/FBC-System-Compatible-Program/System-Compatible-Product-Finder

FlowGuard Gold Limited Warranty 19

SUBMITTAL FOR CHARLOTTE PIPE® CPVC COPPER TUBE SIZE (CTS) FLOWGUARD GOLD® HOT AND COLD DOMESTIC WATER DISTRIBUTION SYSTEM

Date: _____

Job Name: _____ Location: _____

Engineer: _____ Contractor: _____

Scope:
This specification covers Copper Tube Size (CTS) CPVC manufactured to standard dimensional ratio (SDR) 11 for hot and cold domestic water distribution. This system is intended for pressure applications where the operating temperature will not exceed 180° F at 100 psi.

Specification:
Pipe shall be manufactured from virgin rigid CPVC (chlorinated polyvinyl chloride) vinyl compounds with a cell class of 24448 as identified in ASTM D 1784. Fittings shall be manufactured from virgin rigid CPVC (chlorinated polyvinyl chloride) vinyl compounds with a cell class of 23447 as identified in ASTM D 1784.

FlowGuard Gold CTS CPVC pipe and fittings shall conform to ASTM D 2846. Pipe and fittings shall be manufactured as a system and be the product of one manufacturer. All pipe and fittings shall be manufactured in the United States. Pipe and fittings shall conform to NSF International Standards 14 and 61.

Installation:
Installation shall comply with the latest installation instructions published by Charlotte Pipe and Foundry and shall conform to all applicable plumbing, fire, and building code requirements. Buried pipe shall be installed in accordance with ASTM F 1668. Solvent cement joints shall be made using CPVC cement conforming to ASTM F 493. If a primer is required by local plumbing or building codes, then a primer conforming to ASTM F 656 should be used. The system shall be protected from chemical agents, fire-stopping materials, thread sealant, plasticized-vinyl products or other aggressive chemical agents not compatible with CPVC compounds. The system shall be hydrostatically tested after installation. **WARNING!** Never test with or transport/store compressed air or gas in CPVC pipe or fittings. Doing so can result in explosive failures and cause severe injury or death.

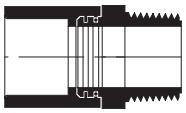
Referenced Standards:

ASTM D 1784:	Rigid Vinyl Compounds
ASTM D 2846:	CPVC Plastic Hot and Cold Water Distribution System
ASTM F 493:	Solvent Cements for CPVC Pipe and Fittings
ASTM F 1668:	Procedures for Buried Plastic Pipe
NSF Standard 14:	Plastic Piping Components & Related Materials
NSF Standard 61:	Drinking Water System Components–Health Effects

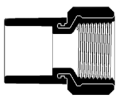
MADE IN U.S.A.


Quarter Bend


Eighth Bend

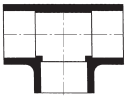

Brass Male Adapter

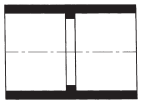

Street Quarter Bend


Brass Female Adapter


Bushing

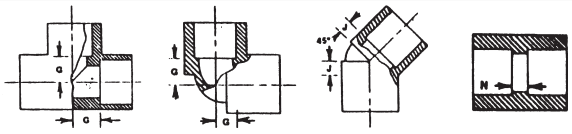

Cap


Tee


Coupling

Not all fitting patterns shown

MINIMUM DIMENSIONS FROM CENTER TO END OF SOCKET (LAYING LENGTH) FOR CPVC 41, SDR 11 FITTINGS



NOMINAL SIZE (IN.)	"G" MINIMUM IN. (mm)	"J" MINIMUM IN. (mm)	"N" MINIMUM IN. (mm)
½	0.382 (9.70)	0.183 (4.65)	0.102 (2.59)
¾	0.507 (12.88)	0.235 (5.97)	0.102 (2.59)
1	0.633 (16.08)	0.287 (7.29)	0.102 (2.59)
1¼	0.758 (19.25)	0.339 (8.61)	0.102 (2.59)
1½	0.884 (22.45)	0.391 (9.93)	0.102 (2.59)
2	1.134 (28.83)	0.495 (12.57)	0.102 (2.59)

PIPE REFERENCE GUIDE

Product	Sizes Available					
	½	¾	1	1¼	1½	2
FlowGuard Gold® CPVC CTS SDR 11	•	•	•	•	•	•

Product Certification

This is to certify that all Plastic Pipe and Fittings manufactured by Charlotte Pipe and Foundry Company are manufactured in the United States and conform to the following standards:

PVC SCH. 40 SOLID WALL PIPE
ASTM D 1784, ASTM D 1785, ASTM D 2665
FHA UM 79a
FEDERAL SPECIFICATION L-P-320a
NSF STANDARD 14 AND 61

PVC SCH. 40 DWV CELLULAR CORE PIPE
ASTM D 4396, ASTM F 891
NSF STANDARD NO. 14

PVC SCH. 40 DWV FITTINGS
ASTM D 1784, ASTM D 2665, ASTM D 3311,
ASTM F1866
FHA UM 79a
FEDERAL SPECIFICATION L-P-320a
NSF STANDARD NO. 14

ConnecTite® PUSH-FIT DWV FITTINGS
ASME A112.4.4, IAPMO IGC 334
NSF STANDARD NO. 14

PVC SDR-21 AND SDR-26 PRESSURE PIPE
ASTM D 1784, ASTM D 2241
NSF STANDARD NO. 14 AND 61

PVC SCH. 40 PRESSURE FITTINGS
ASTM D 1784, ASTM D 2466
NSF STANDARD 14 AND 61

PVC SCH. 40 WELL CASING PIPE
ASTM D 1784, ASTM F 480
NSF STANDARD NO. 14 AND 61

PVC SCH. 80 PIPE
ASTM D 1784, ASTM D 1785
NSF STANDARD NO. 14 AND 61

PVC SCH. 80 FITTINGS
ASTM D 1784, ASTM D 2467
ASTM D 2464 ASTM F 1970
NSF STANDARD NO. 14 AND 61

CORZAN® CPVC SCH. 80 PIPE
ASTM D 1784, ASTM F 441/F 441M
NSF STANDARD NO. 14 AND 61

PVC SDR 35 SEWER MAIN PIPE
ASTM D 1784, ASTM D 3034, SDR 35
ASTM D 3212, ASTM F 477

PVC SEWER AND DRAIN PIPE
ASTM D 1784, ASTM D 2729

PVC THIN WALL PIPE & FITTINGS
ASTM D 1784, ASTM D 2949
NSF STANDARD NO. 14

FLOWGUARD GOLD® CPVC CTS PIPE & FITTINGS
ASTM D 1784, ASTM D 2846
FHA UM-61a
NSF STANDARD NO. 14 AND 61
CSA LISTED ON SPECIFIED ITEMS

CPVC CHEMDRAIN® SCH. 40 PIPE & FITTINGS
ASTM D 1784, ASTM F 2618
NSF STANDARD 14

ABS SCH. 40 DWV CELLULAR CORE PIPE
ASTM D 3965, ASTM F 628
NSF STANDARD NO. 14

ABS PLUS® SCH. 40 DWV CELLULAR CORE PIPE
ASTM D 3965, ASTM D 4396, ASTM F 1488

ABS SCH. 40 DWV FITTINGS
ASTM D 3965, ASTM D 2661, ASTM D 3311
FHA UM 79a
FEDERAL SPECIFICATION L-P-322b
NSF STANDARD NO. 14

CHARLOTTE PIPE AND FOUNDRY COMPANY

Design and Engineering Information

Flame Spread Index (FSI) and Smoke Developed Index (SDI) Rating for ABS, CPVC, and PVC

The ASTM E 84/UL 723 test protocol is specified by the Uniform and International Mechanical Codes to evaluate a material's suitability for inclusion within unducted return air plenum spaces.

Flame Spread and Smoke Developed Rating for FlowGuard Gold® CPVC CTS Piping Systems

- FlowGuard Gold CPVC CTS piping systems are listed and labeled as E84 25/50 rated for use in plenums per ICC Evaluation Service Report PMG 1264.
- FlowGuard Gold CPVC CTS piping systems comply with self-extinguishing requirements of ASTM D635.
- FlowGuard Gold CPVC CTS piping systems meet the V-0 burning class requirements of UL 94.

Flame Spread and Smoke Developed Rating for Corzan® CPVC Schedule 80 Pipe

- Corzan CPVC Schedule 80 pipe in sizes ½" – 6" water-filled is listed and labeled as E 84 25/50 rated for use in plenums per ICC Evaluation Service Report PMG 1264.
- 1/2" - 2" empty Corzan CPVC Schedule 80 pipe is listed and labeled as E 84 25/50 rated for use in plenums per ICC Evaluation Service Report PMG 1264.
- Corzan CPVC Schedule 80 pipe complies with self-extinguishing requirements of ASTM D 635.
- Corzan CPVC Schedule 80 pipe meets the V-0 burning class requirements of UL 94.

Flame Spread and Smoke Developed Rating for ABS

- Per ASTM E 84, ABS **does not** meet the 25/50 flame and smoke requirement for plenum application.

Flame Spread and Smoke Developed Rating for PVC

- Per ASTM E 84, PVC **does not** meet the 25/50 flame and smoke requirement for plenum application.
- PVC piping systems are self extinguishing and will not support combustion.
- PVC piping systems comply with self extinguishing requirements of ASTM D 635.
- PVC piping systems meet the V-0 burning class requirements of UL 94.

NOTICE

Pipe or fittings may be damaged by contact with products containing incompatible chemicals resulting in property damage or personal injury.

- Verify that paints, thread sealants, lubricants, plasticized PVC products, foam insulations, caulks, leak detectors, insecticides, termiticides, antifreeze solutions, pipe sleeve, firestop materials or other materials are chemically compatible with CPVC.
- Do not use edible oils such as Crisco® for lubricant.
- Read and follow chemical manufacturer's literature before using with piping materials.

Pressure/Temperature Relationship

Maximum Operating Temperatures
For Various Piping Systems
(de-rate operating pressure at temperatures in excess of 73°F)

Piping System	Max. Operating Temp. °F
ABS	140
PVC	140
FlowGuard Gold® CPVC CTS	180
Corzan® CPVC Sch. 80	200
ChemDrain®* CPVC	220

* See the ChemDrain Technical Manual for more information on this product.

NOTICE: The maximum recommended temperature and de-rating of working pressure applies to both heat generated from fluid being distributed through pipe system and heat generated from sources external to the pipe system.

Temperature De-Rating For Schedule 40 & 80 PVC & CPVC

The operating pressure of PVC and CPVC pipe will be reduced as the operating temperature increases above 73° F. To calculate this reduction, multiply the operating pressures shown on the previous pages by the correction factors shown below:

Operating Temperature (°F)	Correction Factors PVC	CPVC
73	1.00	1.00
80	.88	1.00
90	.75	.91
100	.62	.82
110	.50	.77
120	.40	.65
130	.30	.62
140	.22	.50
150	NR	.47
160	NR	.40
170	NR	.32
180	NR	.25
200	NR	.20

For example, the operating pressure for 6" Schedule 80 PVC pipe is 280 psi. If the operating temperature is 140° F, the maximum operating pressure is now 62 psi (280 x .22).

Solvent Cements

Pipe and Fitting System	Diameter (in.)	Solvent Cement Standard	Cement Color (common usage, check local code)	Description	Primer (common usage, check local code)
ABS DWV	1½ - 6	ASTM D 2235	Black	Regular or Medium-Bodied	Not Recommended
ABS Plus® Foam Core Pipe	1½ - 4	ASTM D 2235	Black	Regular or Medium-Bodied	Not Recommended
FlowGuard Gold® CPVC CTS	½ - 2	ASTM F 493	Yellow or Green	Medium-Bodied	Optional
CPVC Sch. 80	½ - 2	ASTM F 493	IPS 714 or Oatey CPVC Heavy Duty Orange	Heavy-Bodied	IPS P-70 or Oatey Industrial Grade
CPVC Sch. 80	2½ - 8	ASTM F 493	IPS 714 or Oatey CPVC Heavy Duty Orange	Heavy-Bodied	IPS P-70 or Oatey Industrial Grade
CPVC Sch. 40 ChemDrain	1¼ - 8	ASTM F 493	ChemDrain Mustard Yellow (Required)	Heavy-Bodied	6" and larger: IPS P-70 or Oatey Industrial Grade recommended
PVC DWV or Sch. 40 Pressure	½ - 4	ASTM D 2564	Clear	Regular or Medium-Bodied	Required ASTM F 656
PVC DWV or Sch. 40 Pressure	6 - 16	ASTM D 2564	Clear or Grey	Medium or Heavy-Bodied	Required ASTM F 656
PVC Sch. 80	¼ - 2	ASTM D 2564	Grey	Medium or Heavy-Bodied	Required ASTM F 656
PVC Sch. 80	2½ - 16	ASTM D 2564	Grey	Heavy-Bodied	IPS P-70 or Oatey Industrial Grade

NOTICE: Aerosol or spray-on type primers/solvent cements are not recommended. The practice of aggressively scouring the pipe and fittings with both primer and solvent cement is an integral part of the joining process. Not working the primer or solvent cement into the pipe or fitting could cause potential system failure or property damage.

⚠ WARNING

Primers and cements are extremely flammable and may be explosive. Do not store or use near open flame or elevated temperatures, which may result in injury or death.

- Solvent fumes created during the joining process are heavier than air and may be trapped in newly installed piping systems.
- Ignition of the solvent vapors caused by spark or flame may result in injury or death from explosion or fire.
- Read and obey all manufacturers' warnings and any instructions pertaining to primers and cements.
- Provide adequate ventilation to reduce fire hazard and to minimize inhalation of solvent vapors when working with cements, primers and new piping systems.

Applicator Types

Nominal Pipe Size (in.)	Applicator Type		
	Dauber	Brush Width (in.)	Swab Length (in.)
¼	A	½	NR
⅜	A	½	NR
½	A	½	NR
¾	A	1	NR
1	A	1	NR
1¼	A	1	NR
1½	A	1 - 1½	NR
2	A	1 - 1½	NR
2½	NR	1½ - 2	NR
3	NR	1½ - 2½	NR
4	NR	2 - 3	3
6	NR	3 - 5	3
8	NR	4 - 6	7
10	NR	6 - 8	7
12	NR	6 - 8	7
14	NR	7 - 8	7
16	NR	8+	8

A = Acceptable NR = Not Recommended

NOTICE: Rollers are not recommended.

Joint Curing

The joint should not be disturbed until it has initially set. The chart below shows the recommended initial set and cure times for ABS, CPVC, and PVC in iron pipe size diameters as well as for FlowGuard Gold® CPVC CTS.

Recommended Initial Set Times

Temperature Range	Diameter ½″ to 1¼″	Diameter 1½″ to 3″	Diameter 4″ to 8″	Diameter 10″ to 16″
60° - 100° F	15 min	30 min	1 hr	2 hr
40° - 60° F	1 hr	2 hr	4 hr	8 hr
0° - 40° F	3 hr	6 hr	12 hr	24 hr

NOTICE

A joint should not be pressure tested until it has cured. The exact curing time varies with temperature, humidity, and pipe size. The presence of hot water extends the cure time required for pressure testing. Pressurization prior to joint curing may result in system failure.

Recommended Curing Time Before Pressure Testing

RELATIVE HUMIDITY 60% or Less*	CURE TIME Diameter ½″ to 1¼″		CURE TIME Diameter 1½″ to 3″		CURE TIME Diameter 4″ to 8″		CURE TIME Diameter 10″ to 16″
Temperature Range During Assembly and Cure Periods	Up to 180 psi	Above 180 to 370 psi	Up to 180 psi	Above 180 to 315 psi	Up to 180 psi	Above 180 to 315 psi	Up to 100 psi
60° - 100° F	1 hr	6 hr	2 hr	12 hr	6 hr	24 hr	24 hr
40° - 60° F	2 hr	12 hr	4 hr	24 hr	12 hr	48 hr	48 hr
0° - 40° F	8 hr	48 hr	16 hr	96 hr	48 hr	8 days	8 days

*For relative humidity above 60%, allow 50% more cure time.
The above data are based on laboratory tests and are intended as guidelines.
For more specific information, contact should be made with the cement manufacturer.

*Average number of joints per Quart for Cement and Primer (Source: IPS Weld-on)

Pipe Diameter	½″	¾″	1″	1½″	2″	3″	4″	6″	8″	10″	12″	15″	18″
Number of Joints	300	200	125	90	60	40	30	10	5	2 to 3	1 to 2	¾	½

For Primer: double the number of joints shown for cement.
* These figures are estimates based on IPS Weld-on laboratory tests.
Due to many variables in the field, these figures should be used as a general guide only.

FlowGuard Gold® Pipe

FlowGuard Gold is a registered trademark of The Lubrizol Corporation.

CPVC Copper Tube Size Pipe

FlowGuard Gold® PLUMBING SYSTEMS

NSF®

STRAIGHT LENGTHS PLAIN END SDR 11 CPVC COPPER TUBE SIZE PIPE ASTM D 2846							
PART NO.	NOM. SIZE	UPC # 611942-	QTY. PER SKID	AVG. OD (IN.)	MIN. WALL (IN.)	MAX WORK PRESSURE AT 23°C OR 73°F	WT, PER 100 FT. (LBS.)
CTS 12005	½″ x 10′	04979	12,000′	.625	.068	400 PSI	8.3
CTS 12005	½″ x 20′	04993	24,000′	.625	.068	400 PSI	8.3
CTS 12007	¾″ x 10′	04980	6,000′	.875	.080	400 PSI	13.9
CTS 12007	¾″ x 20′	05145	12,000′	.875	.080	400 PSI	13.9
CTS 12010	1″ x 10′	05146	3,600′	1.125	.102	400 PSI	22.2
CTS 12010	1″ x 20′	05147	7,200′	1.125	.102	400 PSI	22.2
CTS 12012	1¼″ x 10′	05148	2,400′	1.375	.125	400 PSI	33.3
CTS 12012	1¼″ x 20′	05321	4,800′	1.375	.125	400 PSI	33.3
CTS 12015	1½″ x 10′	05150	1,440′	1.625	.148	400 PSI	46.6
CTS 12015	1½″ x 20′	05306	2,880′	1.625	.148	400 PSI	46.6
CTS 12020	2″ x 10′	05152	960′	2.125	.193	400 PSI	79.5
CTS 12020	2″ x 20′	05322	1,920′	2.125	.193	400 PSI	79.5

NOTE: STRAIGHT LENGTH PIPE ARE SHIPPED IN FULL BUNDLE QUANTITY ONLY.

COILED PIPE SDR 11 COILED SDR CPVC COPPER TUBE SIZE PIPE ASTM D 2846							
PART NO.	NOM. SIZE	UPC # 611942-	QTY. PER SKID	AVG. OD (IN.)	MIN. WALL (IN.)	MAX WORK PRESSURE AT 23°C OR 73°F	WT, PER 100 FT. (LBS.)
CTS 12005	½″ x 150′	05313	3,750′	.625	.068	400 PSI	8.3
CTS 12007	¾″ x 100′	05314	2,500′	.875	.080	400 PSI	13.9
CTS 12010	1″ x 100′	10643	1,200′	1.125	.102	400 PSI	22.2

NSF Listed. Meets All Requirements of ASTM D 2846.

MADE IN U.S.A.

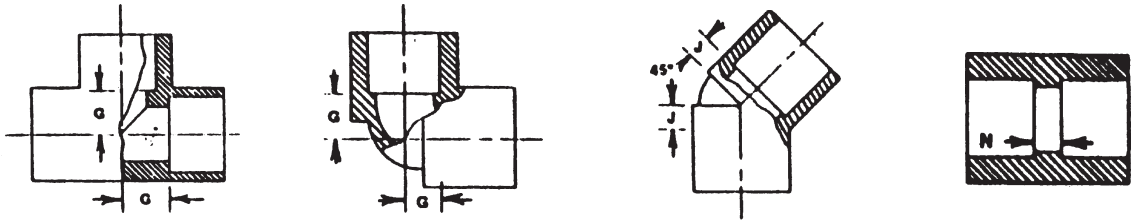
⚠ WARNING

Testing with or use of compressed air or gas in ABS / CPVC / PVC pipe or fittings can result in explosive failures and cause severe injury or death.

- NEVER test with or transport/store compressed air or gas in ABS / CPVC / PVC pipe or fittings.
- NEVER test ABS / CPVC / PVC pipe or fittings with compressed air or gas, or air over water boosters.
- ONLY use ABS / CPVC / PVC pipe or fittings for water or approved chemicals.
- Refer to warnings on PPFA's website and ASTM D 1785.

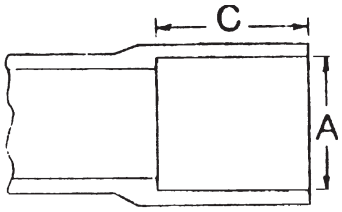
FlowGuard Gold® Fittings

MINIMUM DIMENSIONS FROM CENTER TO END OF SOCKET (LAYING LENGTH) FOR CPVC 41, SDR 11 FITTINGS



NOMINAL SIZE (IN.)	"G" MINIMUM IN. (MM)	"J" MINIMUM IN. (MM)	"N" MINIMUM IN. (MM)
½	0.382 (9.70)	0.183 (4.65)	0.102 (2.59)
¾	0.507 (12.88)	0.235 (5.97)	0.102 (2.59)
1	0.633 (16.08)	0.287 (7.29)	0.102 (2.59)
1¼	0.758 (19.25)	0.339 (8.61)	0.102 (2.59)
1½	0.884 (22.45)	0.391 (9.93)	0.102 (2.59)
2	1.134 (28.83)	0.495 (12.57)	0.102 (2.59)

TAPERED SOCKET DIMENSIONS FOR CPVC 41, SDR 11 PLASTIC PIPE FITTINGS

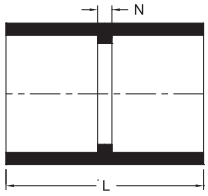


NOMINAL SIZE (IN.)	SOCKET ENTRANCE DIAMETER, IN. (MM) "A" AVERAGE	SOCKET LENGTH, IN. (MM) "C" MINIMUM
½	0.633 (16.08)	0.500 (12.70)
¾	0.884 (22.45)	0.700 (17.78)
1	1.135 (28.83)	0.900 (22.86)
1¼	1.386 (35.20)	1.100 (27.94)
1½	1.640 (41.66)	1.300 (33.02)
2	2.141 (54.38)	1.700 (43.18)

FlowGuard Gold® CPVC CTS Fittings

Coupling
S x S

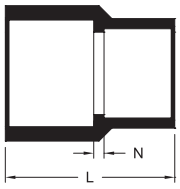
CTS PART NO. 2100



Size	UPC# 611942-	L	N	Approx. Wt. (Lbs)
1/2	04994	1 1/8	1/8	0.016
3/4	05154	1 1/2	1/8	0.027
1	05155	1 15/16	1/8	0.050
1 1/4	05156	2 11/32	1/8	0.085
1 1/2	05157	2 11/16	1/8	0.134
2	05158	3 17/32	1/8	0.300

Coupling
S x S

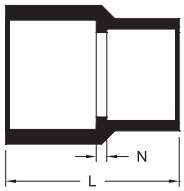
CTS PART NO. 2100



Size	UPC# 611942-	L	N	Approx. Wt. (Lbs)
3/4 x 1/2	05159	1 13/32	3/16	0.02
1 x 3/4	05160	1 13/16	3/16	0.04
1 1/4 x 1 (A)	09942	2 1/2	9/16	0.12

Transition Coupling
IPS S x CTS S

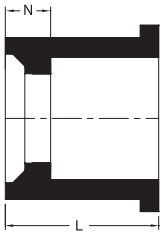
CTS PART NO. 2100 I



Size	UPC# 611942-	L	N	Approx. Wt. (Lbs)
3/4	04996	1 5/8	3/16	0.50
1	05175	2 1/8	1/8	0.07

Reducer Bushing
SPG x S

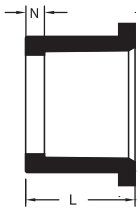
CTS PART NO. 2107



Size	UPC# 611942-	L	N	Approx. Wt. (Lbs)
3/4 x 1/2	04998	27/32	11/32	0.010
1 x 1/2	05177	1 1/32	17/32	0.030
1 x 3/4	05178	1 1/32	5/16	0.020
1 1/4 x 1/2	05179	1 1/4	3/4	0.050
1 1/4 x 3/4	05180	1 7/32	1/2	0.060
1 1/4 x 1	05181	1 1/4	11/32	0.040
1 1/2 x 1/2	05182	1 7/16	15/16	0.080
1 1/2 x 3/4	05183	1 7/16	23/32	0.080
1 1/2 x 1	05184	1 7/16	17/32	0.083
1 1/2 x 1 1/4	05185	1 7/16	5/16	0.050
2 x 1/2	05186	1 13/16	1 5/16	0.170
2 x 3/4	05187	1 13/16	1 3/32	0.170
2 x 1	05188	1 13/16	7/16	0.180
2 x 1 1/4	05189	1 13/16	11/16	0.160
2 x 1 1/2	05190	1 13/16	1/2	0.150

Transition Bushing
IPS SPG X CTS S

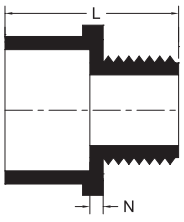
CTS PART NO. 2107 I



Size	UPC# 611942-	L	N	Approx. Wt. (Lbs)
1/2	04999	1 1/32	17/32	0.01
3/4	05191	1 1/8	13/32	0.02
1	05192	1 9/32	3/8	0.03
1 1/4	05193	1 3/8	11/32	0.06
1 1/2	05194	1 1/2	3/16	0.07
2	05195	1 7/8	5/32	0.10

Male Adapter
S x MPT

CTS PART NO. 2109**



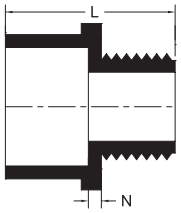
Size	UPC# 611942-	L	N	Approx. Wt. (Lbs)
1/2	05000	1 5/16	1/8	0.02
3/4	05196	1 5/8	3/32	0.04
1	05197	1 31/32	1/8	0.07
1 1/4	05198	2 15/32	1/4	0.12
1 1/2	05199	2 7/8	9/32	0.18
2	05200	3 5/8	7/32	0.34

** For cold water applications only. Does not conform to the requirements of ASTM D 2846.

FlowGuard Gold® CPVC CTS Fittings

Reducing Male Adapter
S x MPT

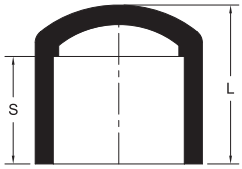
CTS PART NO. 2110**



Size	UPC# 611942-	L	N	Approx. Wt. (Lbs)
3/4 X 1/2	05252	1 3/4	5/32	0.040

Cap
S

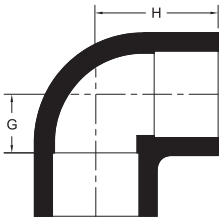
CTS PART NO. 2116



Size	UPC# 611942-	L	S	Approx. Wt. (Lbs)
1/2	05002	3/4	1/2	0.01
3/4	05202	1	23/32	0.02
1	05203	1 1/8	29/32	0.04
1 1/4	05204	1 9/16	1 1/8	0.06
1 1/2	05205	1 23/32	1 5/16	0.10
2	05206	2 1/16	1 23/32	0.21

90 Degree Elbow
S x S

CTS PART NO. 2300

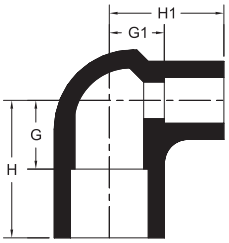


Size	UPC# 611942-	H	G	G1	H1	Approx. Wt. (Lbs)
1/2	04982	7/8	3/8			0.025
3/4	04983	1 1/4	9/16			0.049
1	04984	1 17/32	5/8			0.073
1 1/4	05006	1 27/32	3/4			0.135
1 1/2	05207	2 3/16	7/8			0.213
2	05208	2 27/32	1 5/32			0.456

** For cold water applications only. Does not conform to the requirements of ASTM D 2846.

90 Degree Elbow, Reducing
S x S

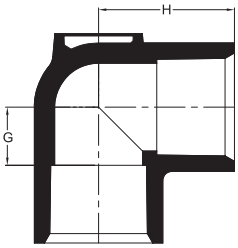
CTS PART NO. 2300



Size	UPC# 611942-	G	G1	H	H1	Approx. Wt. (Lbs)
3/4 X 1/2	05209	13/32	17/32	1 1/8	1 1/32	0.037

Drop Ear Elbow
All CPVC - S x S

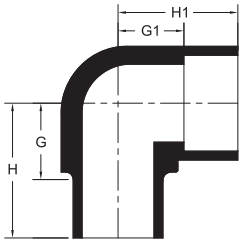
CTS PART NO. 2300 D



Size	UPC# 611942-	H	G	Approx. Wt. (Lbs)
1/2	05007	29/32	3/8	0.03

90 Degree Street Elbow
SPG x S

CTS PART NO. 2304

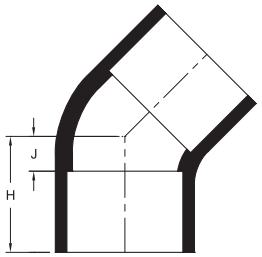


Size	UPC# 611942-	H	G	H1	G1	Approx. Wt. (Lbs)
1/2	05011	1 1/32	17/32	7/8	3/8	0.03
3/4	04985	1 13/32	11/16	1 17/32	13/16	0.05
1	09922	1 23/32	13/16	1 17/32	5/8	0.08
1 1/4	08162	2 7/16	29/32	2 15/32	1 7/32	0.23

FlowGuard Gold® CPVC CTS Fittings

45 Degree Elbow
S x S

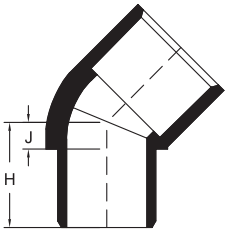
CTS PART NO. 2309



Size	UPC# 611942-	H	J	Approx. Wt. (Lbs)
1/2	05012	11/16	3/16	0.020
3/4	05228	15/16	1/4	0.039
1	05229	1 3/16	9/32	0.059
1 1/4	05230	1 7/16	11/32	0.109
1 1/2	05231	1 11/16	3/8	0.174
2	05232	2 3/16	1/2	0.373

Street Elbow 45 Degree
SPG x S

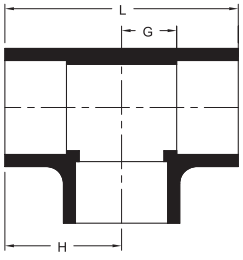
CTS PART NO. 2310



Size	UPC# 611942-	H	J	Approx. Wt. (Lbs)
1/2	05013	11/16	3/16	0.02
3/4	05233	15/16	1/4	0.03
1	10652	1 7/32	5/16	0.06

Tee
S x S x S

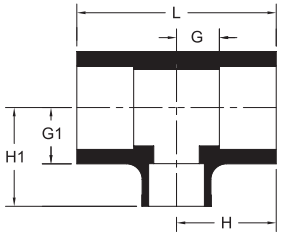
CTS PART NO. 2400



Size	UPC# 611942-	L	H	G	Approx. Wt. (Lbs)
1/2	05014	1 13/16	29/32	13/32	0.032
3/4	05238	2 7/16	1 7/32	1/2	0.059
1	05239	3 1/16	1 17/32	5/8	0.104
1 1/4	05240	3 3/4	1 7/8	25/32	0.177
1 1/2	05241	4 3/8	2 3/16	7/8	0.286
2	05242	5 11/16	2 27/32	1 1/8	0.624

Reducer Tee
S x S x S

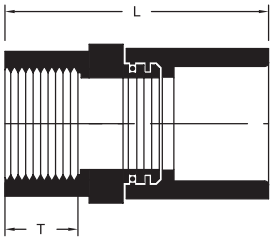
CTS PART NO. 2400



Size	UPC# 611942-	L	H	G	H1	G1	Approx. Wt. (Lbs)
1/2 x 1/2 x 3/4	10685	2 1/16	1 1/32	1/2	1 1/4	17/32	0.04
3/4 x 3/4 x 1/2	05243	2 7/16	1 7/32	1/2	1 1/32	1/2	0.05
3/4 x 3/4 x 1	05019	3 3/8	1 11/16	5/8	1 17/32	5/8	0.15
3/4 x 1/2 x 1/2	05244	2 7/32	1 7/32	1/2	1 1/32	1/2	0.05
3/4 x 1/2 x 3/4	05245	2 1/4	1 7/32	1/2	1 7/32	1/2	0.06
1 x 1/2 x 1/2	05020	3 7/32	1 17/32	5/8	1 11/16	1 3/16	0.17
1 x 1/2 x 3/4	05021	3 7/32	1 17/32	5/8	1 11/16	1 3/16	0.16
1 x 1/2 x 1	05022	3 7/32	1 17/32	5/8	1 17/32	5/8	0.13
1 x 3/4 x 1/2	05023	3 7/32	1 17/32	5/8	1 11/16	31/32	0.16
1 x 3/4 x 3/4	10598	2 25/32	1 7/16	17/32	1 11/32	5/8	0.08
1 x 3/4 x 1	05025	2 31/32	1 19/32	11/16	1 9/16	21/32	0.11
1 x 1 x 1/2	10599	2 5/8	1 5/16	11/32	1 29/32	1 7/32	0.08
1 x 1 x 3/4	05469	2 15/16	1 15/32	9/16	1 3/8	21/32	0.09
1 1/4 x 1 x 1	05038	3 7/8	1 7/8	3/4	2	1 3/32	0.15
1 1/4 x 1 1/4 x 1/2	11262	3	1 1/2	3/8	1 9/32	3/4	0.12
1 1/4 x 1 1/4 x 3/4	11192	3 3/16	1 19/32	15/32	1 1/2	25/32	0.13
1 1/4 x 1 1/4 x 1	11233	3 1/2	1 3/4	5/8	1 11/16	25/32	0.15
1 1/2 x 1 x 1	05056	4 1/2	2 1/4	15/16	2 11/32	1 1/2	0.21
1 1/2 x 1 1/2 x 1/2	11592	3 7/8	1 15/16	5/8	1 11/32	13/16	0.21
1 1/2 x 1 1/2 x 3/4	11232	3 7/8	1 15/16	5/8	1 21/32	15/16	0.21
1 1/2 x 1 1/2 x 1	10686	3 7/8	1 15/16	5/8	1 23/32	25/32	0.21
2 x 2 x 1/2	11234	4 3/16	2 3/32	3/8	1 5/8	1 3/32	0.35
2 x 2 x 3/4	11235	4 7/16	2 7/32	1/2	1 7/8	1 5/32	0.37
2 x 2 x 1	10687	4 11/16	2 11/32	5/8	1 31/32	1 1/16	0.41
2 x 2 x 1 1/2	11236	5 3/8	2 11/16	31/32	2 7/16	1 1/8	0.51

Low-Lead Female Adapter, Brass Threads
BRASS FPT X CTS HUB

CTS PART NO. 2105 L

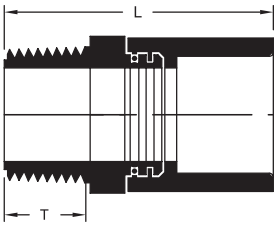


Size	UPC# 611942-	L	T	Approx. Wt. (Lbs)
1/2	12360	1 11/16	5/8	0.17
3/4	12361	1 31/32	5/8	0.22
1	12362	2 9/16	5/8	0.48
1 1/4	12404	3 1/16	3/4	0.88
1 1/2	12405	3 9/32	7/8	1.07
2	12406	3 11/16	31/32	1.48

FlowGuard Gold® CPVC CTS Fittings

Low-Lead Male Adapter, Brass Threads
BRASS MPT X CTS HUB

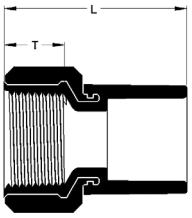
CTS PART NO. 2115 L



Size	UPC# 611942-	L	T	Approx. Wt. (Lbs)
1	12374	2 3/4	3/4	0.39
1 1/4	12407	3 3/16	25/32	0.83
1 1/2	12408	3 1/2	13/16	1.12
2	12409	4 1/32	13/16	1.85

Low-Lead Female Adapter, Brass Threads
BRASS FPT X CTS HUB

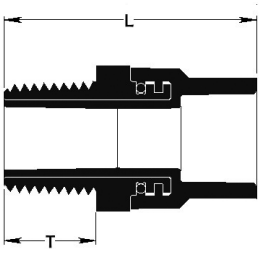
CTS PART NO. 2206 B



Size	UPC# 611942-	L	T	Approx. Wt. (Lbs)
1/2	16416	1 9/16	5/8	0.16
3/4	16417	1 15/16	5/8	0.21
1	16418	2 1/4	3/4	0.34

Low-Lead Male Adapter, Brass Threads
BRASS MPT X CTS HUB

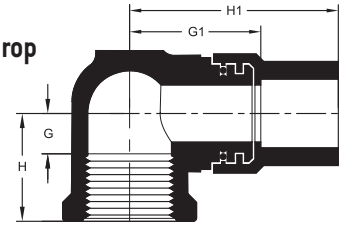
CTS PART NO. 2216 B



Size	UPC# 611942-	L	T	Approx. Wt. (Lbs)
1/2	15358	1 27/32	11/16	0.14
3/4	15359	2	5/8	0.18
1	15360	2 23/32	29/32	0.36

Low-Lead CPVC/Brass Drop Ear Elbow 90 Degree
BRASS FPT X CPVC HUB

CTS PART NO. 2302 L



Size	UPC# 611942-	H	H1	G	G1	Approx. Wt. (Lbs)
1/2	11640	29/32	1 3/4	13/32	17/32	0.28

FlowGuard Gold PLUMBING SYSTEMS

Corzan

Updated: July 11, 2023
Supersedes: February 13, 2023

Chemical Compatibility and Installation Information for CPVC Products

CPVC domestic water and industrial piping systems are designed for use in new construction, re-pipe and repair applications due to their outstanding corrosion resistance. Reasonable care needs to be taken to insure that products coming into contact with CPVC systems are chemically compatible. If a product coming into contact with CPVC is not listed, it is recommended that chemical compatibility be confirmed with the manufacturer of the product. If chemical compatibility with CPVC is in question, it is recommended to isolate the suspect product from contact with CPVC pipe or fittings.

The products listed below are NOT COMPATIBLE with Charlotte® CPVC systems and should NOT be used. Chemically incompatible products are added to this list as they are brought to our attention. A product's absence from this list does not imply or ensure CPVC chemical compatibility. **Always consult http://www.charlottepipe.com for the most up-to-date chemical compatibility listings.**

NOTICE: This information is not a guarantee, and any piping systems using products made of these materials should be tested under actual service conditions to determine their suitability for a particular purpose.

NOTICE

All pipe thread sealants must conform to the requirements of IAPMO's PS 36 and with the thread sealant manufacturer to confirm that these sealants are chemically compatible with ABS, CPVC, and PVC. Incompatible pipe thread sealants may result in the degradation of plastic pipe or fittings resulting in product failure and property damage.

- Verify that paints, thread sealants, lubricants, plasticized PVC products, foam insulations, caulks, leak detectors, insecticides, termiticides, antifreeze solutions, pipe sleeve, firestop materials or other materials are chemically compatible with ABS, CPVC, or PVC.
- Do not use edible oils such as Crisco® for lubricant.
- Read and follow chemical manufacturer's literature before using with piping materials.
- Confirm compatibility of pipe marking adhesive tape with the manufacturer of the tape to ensure chemical compatibility with CPVC pipe and fittings.

Products NOT Compatible with Charlotte® CPVC Systems:

Caulks

(Manufacturer)	(Product Name)
British Gypsum	• Gyproc Sealant
DAP Products, Inc.	• Alex Plus Acrylic Latex Caulk Plus Silicone
	• Kwik Seal Tube & Tile Adhesive Caulk
	• DAP Concrete & Masonry Sealant
GP Gypsum, LLC	• DensDefy™ Liquid Flashing
HUBER Engineered Woods	• ZIP System™ Liquid Flash
Intumescent Systems, Ltd.	• AM Acrylic Acoustic Intumescent Mastic
ITW Polymers Sealants	• Permathane SM7108 Polyurethane Sealant
John Wagner Associates	• Grabber Acoustical Sealant GSCS
Knauf	• Knauf Sealant
Master Builders-Admixtures, US, LLC	• MaxFlash Flashing Membrane
No Nonsense Limited	• Nemesis Fire Rated Hybrid Sealant 290 ML
OSI Sealants (Dartworth Company) / (Ohio Sealants)	• Polyseamseal All Purpose Adhesive Caulk
	• Polyseamseal Tub & Tile Adhesive Caulk
	• Pro Series PC-158 Caulk
Pecora	• AC-20 Acrylic Latex Caulk & Silicone
Polyseam Ltd	• Protecta FR Acrylic Caulk • Protecta FR Graphite Caulk
Red Devil, Inc.	• Red Devil 3000 Blacktop & Roof Repair Sealant
Silka Corporation	• Silkaflex® Self-Leveling Sealant
Tremco®	• Dymonic® 100
United States Gypsum	• Sheetrock Brand Acoustical Sealant
White Lightning	• 3006 All Purpose Adhesive Caulk

Fire Stopping Systems

3M	• Fire Barrier 2003 Silicone • Fire Barrier CP25WB+
	• Fire Barrier Sealant FD 150+
	• Fire Barrier Tuck-in-Wrap Strips
	• FireDam Spray 200
Bostik Limited	• Bostik Intucrylic Sealant White
BritChem Limited	• FR Intumescent & Acoustic Acrylic Sealant
Everbuild	• Everbuild Fire Mate Sealant C3
Firetherm	• Intumastic HP
Fireus Ltd.	• Safire Intumescent Mastic
Fischer	• Fischer FFB-ES Elastoseal
Flame Stop	• Flame Stop V
Hilti	• CP506 Smoke and Acoustic Sealant
	• CP606 Flexible Firestop Sealant
	• Hilti CP 672 Speed Spray
	• CFS-SP WB (DINP)
No Nonsense Limited	• No Nonsense Intumescent Acrylic Sealant
Passive Fire Protection Partners	• 4100NS

Products NOT Compatible with Charlotte CPVC Systems

Fire Stopping Systems (continued)

(Manufacturer)	(Product Name)
Promat	• Grafitex
Proset	• Proseal Plug, Black
	• Proseal Plug, Red
Rockwool	• FirePro Acoustic Intumescent Sealant
Speedline	• Speedline Intumescent Fire Protection & Acoustic Sealant
USG	• Firecode® Smoke-Sound Sealant

Leak Detector

(Manufacturer)	(Product Name)
Federal Process Company	• Gasoila Leak Tech
G.F. Thompson Co. Ltd.	• Masters Leak Detector
Radnor Welding Products	• Radnor® Leak Test Regulator Temperature
Rector Seal®	• RectorSeek™ Low Temp
Unipak A/S	• Multitec Leak Detecting Spray

Mold Cleaners/Inhibitors

Anabec Systems	• Anabec Advanced Cleaning Solution • Anasphere Plus™
Betco Corporation, LTD	• Betco ph7Q Dual
Coating Systems Laboratories, Inc.	• Zoonocide
Daycon Products Company, Inc.	• MDRO/MRSA One Step Disinfectant
	• Spectra System 4 404 1:28 Neutral Disinfectant
Fiberlock Technologies, Inc.	• Shock Wave (Disinfectant)
	• IAQ Advanced Peroxide Cleaner No. 8314
	• Fiberlock IAQ200
Fire Retardant Coatings of Texas	• FX Lumberguard
Great Lakes Laboratories	• Clean 'n Etch
H.B. Fuller Construction Products	• Foster First Defense 40-80 Disinfectant
Legend Brands	• ODORx-9-D-9
Microban Systems	• Microban QCG
ProRestore Products	• Mediclean Germicidal Cleaner Concentrate
	• Dri-EAz Milgo Plus • Microban Milgo Plus
	• ProRestore QGC • MediClean QGC
Red Devil, Inc.	• Red Devil Painter's Caulk
Serum Products, LLC	• Serum 1000
ServiceMaster Clean	• Odorgo Smoke Odor Counteractant
	• Sanimaster 6
Waxie Sanitary Supply	• Waxie HP Disinfectant Cleaner
Wepak National	• Non-Acid Bath Disinfectant
X-M Industries	• Structure-Guard Mold and Mildew Resistant Coating

Miscellaneous Materials

Carlisle HVAC Products	• CCWI Duct Sealant
Various Sources	• Peppermint Oil • Roofing Tar •Vaseline • Vegetable Oils

Pipe Clamps

Naylon Products	• Naylon Vinyl-Coated Wire Pipe Hangers

Pipe Tape

Christy's	• Pipe Wrap Tape
Pasco	• All Weather PVC Pipe Wrap
Pro Pak, Inc.	• Pipe Wrap Tape (black)
Wonder	• No. 413 Pipe Wrap Tape

Thread Sealants

Allied Rubber and Gasket Co. (ARGCO)	• Super Dope
Anti-Sieze Technologies	• TFE Paste
Devcon	• Super Lock Hi-Strength, Stud Lock Grade 2271
G.F. Thompson Co. Ltd.	• Masters™ Pro-Dope™ with Teflon®
General Sealant	• GS-600
Hercules	• Brush-On/Blue Block
Hernon Mfg., Inc.	• Powerseal #932
J.C. Whitlam Mfg. Co	• Seal Unyte Thread & Gasket Sealer
Jet Lube, Inc.	• Jet Lube V-2
Jomar	• Tighter-than-Tite
Loctite	• Threadlocker 242 • Loctite 577
National Starch & Chemical Permabond Division	• Permabond LH-050, Permabond LH-054
Permabond Engineering Adhesives, Ltd.	• Permabond A1044
Permatex Company, Inc.	• Permatex 14H
Rule	• High Performance Teflon Thread Sealing Compound
Saf-T-Lok Chemical	• Saf-T-Lok TPS Anaerobic Adhesive/Sealant, Indus. Grade TPS
SOS Products	• Teflon Pipe Dope
Swagelock Company	• SWAK

Waterproofing

PROSOCO, Inc.	• R-Guard® FastFlash® Roller Grade
	• R-Guard® Cat 5® Rain Screen
Tremco	• TREMproof 250GC single component polyurethane

OTHER CHEMICAL COMPATIBILITY CONCERNS and INSTALLATION INFORMATION

NOTICE

Prior to installation, check with the manufacturer of the HVAC equipment to confirm the compatibility of residual oils and refrigerants with ABS, CPVC, or PVC.

Prior to installing CPVC or PVC piping in hydronic applications, it is important to flush the interior of the heat exchangers and the exterior of the evaporator coils thoroughly with a mild ionic detergent solution to remove incompatible oils. Failing to do so could result in system failure and property damage.

Verify that all boiler cleaning and sealing chemicals used in hydronic radiant heating systems are compatible with CPVC or PVC. Failure to do so could result in system failure and property damage.

Equipment leaks in refrigeration or HVAC systems may release POE oils or other contaminants into the piping system. These oils and contaminants are incompatible with CPVC or PVC and such exposure may result in pipe or fitting failure regardless of flushing.

NOTICE

To reduce risk of property damage from chemical incompatibility with CPVC read and follow these instructions before using any chemical with pipe or fittings.

Acetone in Primers, Cleaning and Solvent Cements:

- Primers, cleaners, and solvent cements containing appreciable amounts of acetone may cause rapid environmental stress cracking of CPVC metal insert parts during installation at freezing temperatures. Contact your primer/cleaner/solvent cement manufacturer for more information or recommendation of alternatives.

Adhesives:

- Pipe sleeves, insulation and tapes manufactured with adhesives may contain incompatible chemicals which can harm CPVC systems. Consult with the manufacturer of these products to determine if the adhesives used are compatible with CPVC systems.

Antifreeze, Glycerin from Biodiesel:

- Crude glycerin from biodiesel manufacturing is not recommended for use as an antifreeze or heat transfer fluid in CPVC piping systems. Crude glycerin from biodiesel manufacturing may be contaminated with the biodiesel, its intermediary chemicals, and/or waste products from the biodiesel manufacturing process.

Cleaning CPVC Pipe:

- While common ordinary soaps are not detrimental to CPVC, most modern dishwashing liquids contain synthetic detergents, some of which may cause environmental stress cracking of fittings. A mild ionic detergent solution to remove incompatible oils or chemicals is recommended. A rinse with clean water to completely clean the system is advisable as a final flushing. Contact your dishwasher detergent manufacturer for more information or a recommendation of alternatives.

Flexible Wire and Cable:

- Direct contact with flexible wire and cable jacketing that utilize insulation containing plasticizers is not recommended. Section 334.30 of the National Electric Code (2002 Edition) requires wire and cable to be secured by staples, cable ties, straps, or hangers. Air ducts, pipes and ceiling grid are not acceptable supports for wire and cable. Also see section titled "Rubber and Flexible Materials Containing Plasticizers."

Fragrances–Perfumes:

- Scented products such as cologne, perfumes, or essential oils (peppermint oil, orange oil, spearmint oil, etc.) should not be put into a CPVC piping system for the purpose of being able to detect leaks by odor. Most fragrance chemicals and essential oils are strong solvents and/or environmental stress cracking agents for CPVC.

Fungicides and Mold Inhibitors:

- When performing repairs to leaks in existing systems, care should be taken to isolate CPVC pipe from direct contact with heavy concentrations of fungicide products which may be applied during cleanup of water damage. Vinyl piping materials such as PVC or CPVC may be damaged by fungicides when fungicides are sprayed on surrounding drywall and wood framing to prevent the growth of mold and mildew in the affected area. Common sense precautions will prevent problems with repairs to existing systems. When repairs are made to an existing system, and the possibility exists that fungicides will be applied to treat damp drywall and wood framing surrounding the repair site, exposed piping should be sleeved with a compatible plastic sleeving or pipe insulation material to prevent direct contact of the fungicide with the plumbing systems.

Grease and Cooking Oils:

- When CPVC pipe is installed in kitchen areas the pipe must be protected from contact with grease or cooking oils. Consideration must be given to not only protecting the pipe from direct contact with grease or oil as well as contact that may occur from airborne grease or oil.

Hoses:

- Hoses used for filling and/or testing piping systems may contain plasticizers or other contaminates that are incompatible with CPVC. It is therefore a good practice to flush hoses with clean water for at least one minute before connecting them to CPVC systems for filling or testing the system.

Insulation:

- Tubing insulation for use with CPVC should be fiberglass, mineral wool, foamed polyolefin (polyethylene), foamed polyisocyanurate or phenolic. Foamed rubber tubing insulation may contain incompatible plasticizers and is not preferred. Foamed polyolefin, foamed plyisocyanurate and phenolic insulations should not have any oil lubrication applied to the interior surface.

Leak Detectors (Soaps Used):

- While common ordinary soaps are not detrimental to CPVC, most modern dishwashing liquids contain synthetic detergents, some of which may cause environmental stress cracking of CPVC.

Mastics for Use with Pipe and Duct Insulation:

- Some mastic products have a thin paint-like consistency and can be applied with a spray gun, brush, or roller in thin coats similar to paint. For these type of mastic products, follow our paint guidance.
- Other mastic products are thicker pastes or caulk-like products that are applied with brushes, trowels or caulking guns. While Charlotte Pipe is not aware of any pipe or fitting failures that have been directly attributable to insulation mastics, a review of formulation information indicates that some of these products contain ingredients that are incompatible with CPVC.
- Always confirm compatibility with the mastic manufacturer.

Metal Piping Connected to or Installed Alongside CPVC Piping:

- CPVC may be damaged by torches and/or chemicals used to install metal piping. When metal piping is installed in proximity to CPVC piping systems, care should be taken to protect the CPVC from burning with torches or contact with molten solder or solder flux, as well as incompatible thread sealants, leak detectors, lubricants, or other chemical products which may be used on metal piping.
- Transitions from metal pipe to CPVC pipe can be made through a variety of methods such as threaded connections, flanges, and grooved adapters. Occasionally the metal pipe may contain residual oils that were used to aid in the cutting process. Some of the oils used for this purpose, especially those marketed as "environmentally friendly" or "vegetable based" may be incompatible with CPVC. If a cutting oil is used, consult with the manufacturer of the cutting oils for a specific recommendation as to compatibility with CPVC.
- Dye penetrants used to test the quality of welds in metal piping may contain plasticizers or other chemicals incompatible with CPVC. Dye penetrants left on the inside surface of welded metal pipes may later wash into CPVC piping connected to it. This situation could create environmental stress cracking in CPVC wherever collections of the penetrant chemical might lodge. These penetrants should be removed from the metal pipe prior to connecting to CPVC, or the manufacturer of the dye penetrant should be consulted with regard to recommending a proper penetrant to use with metal/CPVC systems.

Paint:

- Water-based acrylic latex paint is the preferred and recommended paint to use on CPVC pipe and fittings. Oil or solvent-based paints may be chemically incompatible.

Polyurethane (Spray-on) Foams:

- In understanding spray polyurethane foams, there are two general areas of concern for CPVC pipe and fittings; (1) chemical compatibility and (2) potential damage to pipe and fittings due to high temperatures generated as a result of the exothermic chemical reaction during the installation and curing process. It is possible to apply polyurethane foam insulation properly without damage to CPVC pipe and fittings. However, the use of polyurethane foam insulation in conjunction with CPVC has resulted in the failure of CPVC pipe and fittings and property damage. Therefore, Charlotte Pipe and Foundry does not recommend the use of polyurethane spray-on foam insulation in conjunction with its CPVC pipe and fittings.

Products Containing Plasticizers:

- CPVC is not compatible with some rubber and flexible vinyl materials containing certain types of plasticizers. Incompatible plasticizers include, but are not limited to, phthalates, adipates, trimellitates, dibenzoates, etc. Compatibility should be confirmed before selecting rubber for flexible vinyl materials for direct contact with CPVC. Examples of materials which may contain incompatible plasticizers include, but are not limited to, caulks, rubbery hanger padding, vinyl dip coating on metal parts, rubber gaskets, electrical wire jacketing, electrical tape, flexible hose or tube, etc. Further, plasticizers may leach from rubber or flexible vinyl materials, such as hoses or tank linings, into the process fluid which contacts them. Plasticizer contamination in the process fluid may also cause environmental stress cracking of CPVC used elsewhere in the system. This can include both CPVC process piping, through which contaminated fluid may flow, or CPVC ducting drawing fumes from contaminated fluid. Tapes or labels with a plasticized vinyl body (e.g., electrical tape) should not be used.

Residual Oils with HVAC Applications:

- Some heat exchangers or condenser coils may contain residual oils from the manufacturing process which can cause cracking of CPVC. Caution should be exercised when installing CPVC in combination hot/air handling units or as condensate-drain lines from air conditioning systems. Confirm the compatibility of CPVC with residual oils prior to installation. The interior of heat exchangers or the exterior of condenser coils may be thoroughly flushed with mild detergent solution to remove incompatible oils prior to piping installation. A rinse with clean water to completely clean the system is advisable as a final flushing. Some refrigerant systems contain oils that may damage CPVC and such exposure may result in pipe or fitting failure regardless of cleaning or flushing the system.

Sleeving Materials:

- In situations where sleeving is required, the pipe should be protected with a compatible sleeving material extending at least 12" above and below the soil. The top of the sleeving should be securely taped to the pipe with a compatible tape product. Backfill over underground piping prior to termiticide spraying.

Spray-on Coatings:

- Certain types of spray-on coatings which form a peelable film to protect fixtures during construction may be incompatible with CPVC. Care should be used to protect exposed piping from overspray when this type of protective coating is applied.

Steel Pipe with Antimicrobial Coating:

- Contractors should not use steel pipe with antimicrobial coating, such as Allied's ABF 11, in conjunction with CPVC pipe and fittings, unless the factory-applied coated steel pipe has been approved by the pipe manufacturer.

Stretch Wrap or Shrink Wrap:

- Polyethylene stretch wrap is not compatible with CPVC. PVC stretch wrap is plasticized and often incompatible with CPVC. Contact with PVC stretch wrap should be avoided.

Termiticides and Insecticides:

- When performing an under-slab installation, or where the presence of insecticides or termiticides is likely, care should be taken to isolate CPVC pipe from direct contact with large quantities of these chemicals. Vinyl piping materials such as PVC or CPVC may be damaged when termiticides or insecticides are injected into the annular space between the pipe wall and sleeving material trapping the termiticide against the pipe wall. Termiticide applications per label instructions in an open-air environment, such as slab pretreat applications, should not pose a problem. However, puddling of termiticides on or near CPVC may cause failure. In areas where puddling is more likely, such as near tub boxes and retreat applications, extra care should be taken to avoid puddling of termiticides. Exercising caution and common sense should prevent installation problems. For more information, review your manufacturer's installation guide.
- Additional precautions need to be taken when retreat applications are required. Termiticide retreatment is usually required when the concrete slab has been broken to relocate a pipe. The following recommendations should be followed in retreat applications:
  - Remove all the plastic barrier material that was installed prior to the initial concrete pour from the area to be retreated. Do not reinstall the plastic barrier material.
  - After the pipe has been relocated, the soil should be pretreated before it is placed in hole around the pipe. Do not apply termiticide directly to the retreat area.
  - Termiticides that contain cypermethrin should not be used in retreat applications.
- Note: Many insecticides and termiticides are incompatible with CPVC. Assume that all are aggressive and not compatible with CPVC pipe and fittings.
- When installing CPVC where the presence of insecticides or termiticides is likely, confirm compatibility prior to application. Exercise caution. For more information, review your manufacturer's installation guide.

Installation Notes:

- Use CTS CPVC male threaded adapters for cold water only.
- Protect CPVC from long term exposure to direct sunlight.
- Space CPVC more than 6 inches from gas flue.
- Allow for thermal expansion and contraction.

FlowGuard Gold® CPVC CTS Limited Warranty

Charlotte Pipe and Foundry Company (Charlotte Pipe®) warrants to the original owner of the structure in which its FlowGuard Gold CPVC CTS Pipe and Fittings (the "Products") have been installed, that the Products will be free from manufacturing defects and conform to currently applicable ASTM standards under normal use and service for a period of ten (10) years from date of delivery. Buyer's remedy for breach of this warranty is limited to replacement of, or credit for, the defective product. This warranty excludes any expense for removal or reinstallation of any product and any other incidental, consequential, or punitive damages. **This limited warranty is the only warranty made by seller and is expressly in lieu of all other warranties, express and implied, including any warranties of merchantability and fitness for a particular purpose.** No statement, conduct or description by Charlotte Pipe or its representative, in addition to or beyond this Limited Warranty, shall constitute a warranty. This Limited Warranty may only be modified in writing signed by an officer of Charlotte Pipe.

This Limited Warranty will not apply if:

1) The Products are used for purposes other than the transmission of domestic water.
2) The Products are not installed in good and workmanlike manner consistent with normal industry standards; installed in compliance with the latest instructions published by Charlotte Pipe and good plumbing practices; and installed in conformance with all applicable plumbing, fire and building code requirements.
3) This limited warranty does not apply when the products of Charlotte Pipe are used with the products of other manufacturers that do not meet the ASTM standard or that are not marked in a manner to indicate the entity that manufactured them.
4) The Products fail due to defects or deficiencies in design, engineering, or installation of the water distribution system of which they are a part.
5) The Products have been the subject of modification; misuse; misapplication; improper maintenance or repair; damage caused by the fault or negligence of anyone other than Charlotte Pipe; or any other act or event beyond the control of Charlotte Pipe.
6) The Products fail due to the freezing of water in the Products.
7) The Products fail due to contact with chemical agents, fire stopping materials, thread sealant, plasticized vinyl products, or other aggressive chemical agents not compatible with CPVC compounds.

Charlotte Pipe products are manufactured to the applicable ASTM standard. Charlotte Pipe and Foundry **cannot** accept responsibility for the performance, dimensional accuracy, or compatibility of pipe, fittings, gaskets, or couplings not manufactured or sold by Charlotte Pipe and Foundry.

This Limited Warranty will not apply unless written notice of a claim is mailed to Charlotte Pipe at the address below within 30 days of the day of discovery of the allegedly defective product.

Any Charlotte Pipe products alleged to be defective **must** be made available to Charlotte Pipe at the following address for verification, inspection and determination of cause:

Charlotte Pipe and Foundry Company
Attention: Technical Services
2109 Randolph Road
Charlotte, North Carolina 28207

Purchaser must obtain a return materials authorization and instructions for return shipment to Charlotte Pipe of any product claimed defective or shipped in error.

Any Charlotte Pipe product **proved** to be defective in manufacture will be replaced F.O.B. point of original delivery, or credit will be issued, at the discretion of Charlotte Pipe.

5/19/23

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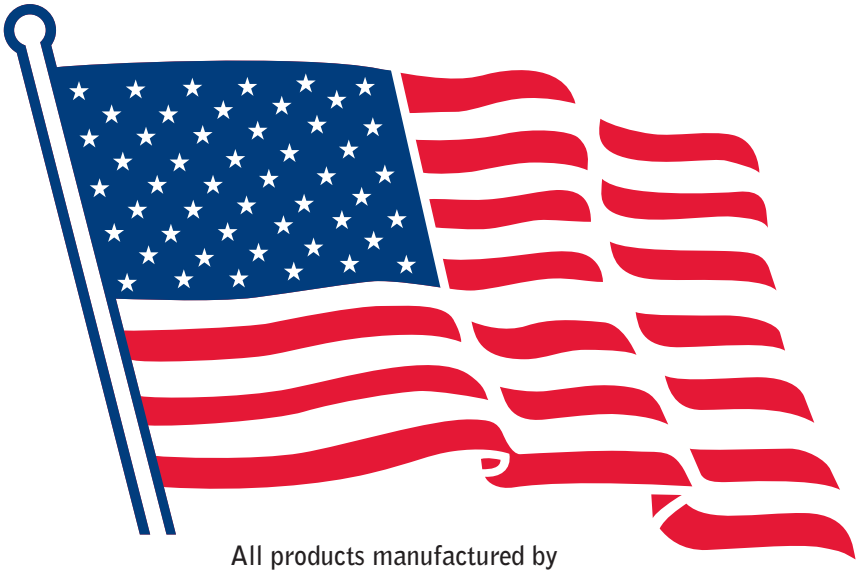

All products manufactured by
Charlotte Pipe and Foundry Company
are proudly made in the U.S.A.