



# Marine Submittal for Spears® Manufacturing Company EverTUFF® CTS CPVC Hot & Cold Water Distribution System



MSCTS-7

Job Name: \_\_\_\_\_

Location: \_\_\_\_\_

Engineer: \_\_\_\_\_

Contractor: \_\_\_\_\_

## EverTUFF® CTS CPVC Hot & Cold Water Distribution System



### Scope:

Covers Spears® EverTUFF® CPVC CTS Hot & Cold Water Distribution System suitable for marine potable water applications and consists of SDR11 solid wall pipe and fittings and a one-step primerless solvent cement. This system is intended for use in non-essential areas of a ship or living space with a pressure / temperature rating of 100 psi @ 180°F.

### Product Specification:

Spears® EverTUFF® CPVC CTS Hot & Cold Water Distribution System shall be constructed from CPVC 4120 with minimum Cell Classification of 23447 per ASTM D1784 and available in sizes ½" through 2". EverTUFF® CPVC CTS Hot & Cold Water Distribution System shall be produced to applicable requirements of ASTM D 2846 and rated to 100 psi at 180°F, unless specifically designated for cold water service only. Solvent cement shall be produced to applicable requirements of ASTM D2846 and ASTM F493. All supply stops shall be 1/4 turn angle or straight pattern CPVC with NPT male thread outlets or sockets. All ball valves shall be CPVC sealed unit type with EPDM O-ring, double stop Polypropylene handle and socket end connectors. EverTUFF® CPVC CTS Hot & Cold Water Distribution System shall be certified lead-free for potable water use by NSF International in accordance with NSF® 61 and NSF® 372. EverTUFF® CPVC CTS Hot & Cold Water Distribution System shall be approved by the United States Coast Guard, meet the low flame spread requirements and smoke and toxicity requirements of the 2010 FTP Code Annex 1, Parts 2 and 5, and may be installed in accommodation, service and control spaces without meeting the additional requirements of 46 CFR 56.60-25(a) (2) as manufactured by Spears® Manufacturing Company.

All pipe, fittings, and cement shall be supplied together as a complete system with a Limited Lifetime Warranty as EverTUFF® CPVC CTS Hot & Cold Water Distribution System manufactured by Spears® Manufacturing Company.

### Product Marking:

All pipe shall be marked EverTUFF® with NSF® Listing and US Coast Guard Approval Number, testing laboratory File Number and pressure/temperature rating of 100 psi @ 180°F. Fittings and miscellaneous components shall be engraved with NSF® Listing and applicable ASTM Standard and bear a USCG mark for use in marine applications.

### Installation:

EverTUFF® CPVC CTS Hot & Cold Water Distribution System is suitable for use on ships, marine vessels and oil rig platforms in non-essential applications such as potable water applications requiring no fire endurance testing. EverTUFF® may be installed in concealed spaces in accommodation, service, and control spaces without meeting the additional requirements of 46 CFR 56.60-25(a)(2) Installation shall comply with the current installation instructions provided by Spears® Manufacturing Company and all regulations applicable to the vessel such as Subchapter F of Title 46 of the Code of Federal Regulations. Solvent cemented joints shall be assembled using a "one-step" primerless type CPVC cement specially formulated for resistance to chemicals and manufactured in accordance with ASTM F493. Refer to EverTUFF® CPVC CTS Hot & Cold Water Distribution System technical guide (CTS-3) for more information on installation, product weights & dimensions.

**WARNING:** Product should never be tested with compressed air or gas. Doing this can result in catastrophic failure and cause injury or death.

### Referenced Standards:

- ASTM D1784 – Rigid Vinyl Compounds
- ASTM D2846 – CPVC CTS Hot & Cold Water Distribution System
- ASTM F493 - Cement for CPVC Pipe & Fittings
- NSF® 61 – Drinking Water System Components – Health Effects
- NSF® 372 – Lead Content
- Title 46 CFR – Code of Federal Regulations

### Features:

- Lightweight
- Corrosion and Chemical Resistant
- Long Service Life

### Approvals:

- USCG – US Coast Guard
- NSF® – NSF International





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### CTS Pipe Information

Pipe - CPVC CTS SDR 11 20' Lengths NSF® Certified Lead Free					
Part Number	Size	Length	Avg. O.D.	Minimum Wall	Approx Wt. (Lbs./Ft.)
CTS-005-20	1/2	20	.625	.060	.07
CTS-007-20	3/4	20	.875	.080	.14
CTS-010-20	1	20	1.125	.102	.24
CTS-012-20	1-1/4	20	1.375	.125	.34
CTS-015-20	1-1/2	20	1.625	.148	.50
CTS-020-20	2	20	2.125	.193	.71

Pressure-Temperature De-Rating Factors For CTS CPVC 4120 SDR 11 Piping Systems		
°F	Factor	Rating, PSI
73	1.00	400
80	1.00	400
90	0.91	360
100	0.82	325
120	0.65	260
140	0.50	200
160	0.40	160
180	0.25	100

The pressure de-rating factor is the same for all pipe sizes

### Hanger Spacing (ft.) According to Operating Temperature, SDR 11 Pipe

Pipe Size (CTS) Nominal Inches	Operating Temperature			
	73°F	100°F	140°F	180°F
1/2	4	4	3-1/2	3
3/4	.5	4-1/2	4	3
1	5-1/2	5	4-1/2	3
1-1/4	6	5-1/2	5	4
1-1/2	6-1/2	6	5-1/2	4
2	7-1/2	7	6-1/2	4

Example: Determine the maximum allowable operating pressure for a CTS CPVC piping system with an operating temperature of 140°F. Using de-rating factor of 0.50 for 140° from the above chart, multiply the pressure rating at 73°F [23°C] by the de-rating factor = 400 x 0.50 = 200 psi.

### Thermal Expansion for CTS CPVC Piping in Inches

Temp Change ΔT °F	Length of Run in Feet													
	5	10	15	20	25	30	35	40	45	50	70	90	120	160
	Thermal Expansion (Inches)													
20	0.04	0.08	0.12	0.15	0.19	0.23	0.27	0.31	0.35	0.38	0.54	0.69	0.92	1.23
30	0.06	0.12	0.17	0.23	0.29	0.35	0.40	0.46	0.52	0.58	0.81	1.04	1.38	1.84
40	0.08	0.15	0.23	0.31	0.38	0.46	0.54	0.61	0.69	0.77	1.08	1.38	1.84	2.46
50	0.10	0.19	0.29	0.38	0.48	0.58	0.67	0.77	0.86	0.96	1.34	1.73	2.30	3.07
60	0.12	0.23	0.35	0.46	0.58	0.69	0.81	0.92	1.04	1.15	1.61	2.07	2.76	3.69
70	0.13	0.27	0.40	0.54	0.67	0.81	0.94	1.08	1.21	1.34	1.88	2.42	3.23	4.30
80	0.15	0.31	0.46	0.61	0.77	0.92	1.08	1.23	1.38	1.54	2.15	2.76	3.69	4.92
90	0.17	0.35	0.52	0.69	0.86	1.04	1.21	1.38	1.56	1.73	2.42	3.11	4.15	5.53
100	0.19	0.38	0.58	0.77	0.96	1.15	1.34	1.54	1.73	1.92	2.69	3.46	4.61	6.14