Marine Submittal for Spears® Manufacturing Company
EverTUFF® CPVC Schedule 40 & 80 Pipe and Fittings

MS4080-7

Job Name: _____ **Location:** _____

Engineer: _____ **Contractor:** _____

EverTUFF® CPVC Schedule 40 & 80 Pipe and Fittings

Industrial Schedule 80 CPVC Pipe and Fittings

Scope:
This specification covers a CPVC Schedule 40 & 80 Pipe and Fittings System for marine applications and consists of solid wall pipe in schedule 40 & 80, Schedule 80 fittings and a two-step primer / solvent cement joining process. This system is intended for use in non-essential areas of a ship or accommodation space with schedule pressure / temperature ratings. See Table A.

Product Specification:
Spears® EverTUFF® CPVC Schedule 40 and Schedule 80 pipe and Schedule 80 fittings shall be manufactured by Spears® Manufacturing Company from a Type IV, Grade I Chlorinated Polyvinyl Chloride (CPVC) compound with a Cell Classification of 23447 per ASTM D1784. The pipe and fittings shall be manufactured in strict compliance to ASTM F441 and ASTM F439 respectively consistently meeting the quality assurance test requirements of these standards. All Spears® EverTUFF® pipe and fittings shall be manufactured in the USA. The pipe shall be provided with plain ends in 20 foot cut lengths and wrapped for protection. All Spears® EverTUFF® pipe and fittings shall be certified by NSF International for potable water applications and marked accordingly and available in Sizes ½" through 12". All EverTUFF® CPVC 40 and Schedule 80 pipe 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 EverTUFF® CPVC Schedule 40 and Schedule 80 pipe and Schedule 80 fittings shall be approved by the American Bureau of Shipping (ABS) and meet IMO FTP Code Annex 1, Part 5 for Surface Flammability (IMO Resolution A.653 (16) for Low Flame Spread) with a Limited Lifetime Warranty as manufactured by Spears® Manufacturing Company.

Product Marking:
All pipe shall be marked EverTUFF® CPVC schedule 40 & 80 as applicable and shall be marked with NSF® Listing, applicable ASTM Standard, U.S. Coast Guard Approval Number., testing laboratory File Number and applicable pressure @ 73° F. (23° C). Schedule 80 Fittings shall be engraved with NSF® Listing, applicable ASTM Standard and bear a USCG mark for use in marine application

Installation:
EverTUFF® CPVC Schedule 40 & 80 Pipe and Schedule 80 Fittings System is suitable for use on ships, marine vessels or oil rig platforms in non-essential applications such as fresh water, sea water, potable water, drains and sanitary vents, in services requiring no fire endurance testing. EverTUFF® CPVC Schedule 40 & 80 Pipe and Schedule 80 Fittings 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 “two-step” primer and CPVC cement joining system. Refer to EverTUFF® CPVC Schedule 40 & 80 Pipe and Fittings System technical guide 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 F441 – CPVC Schedule 40 & 80 Pipe
ASTM F439 – CPVC Schedule 80 Fittings
ASTM F493 – Cement for CPVC Pipe & Fittings
IMO A.653 - Fire Test Procedure for Surface Flammability
Title 46 CFR – Code of Federal Regulations

Features:
Lightweight
Corrosion and Chemical Resistant
Long Service Life

Approvals:
ABS – American Bureau of Shipping
USCG – US Coast Guard
NSF® – NSF International

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CPVC INDUSTRIAL PIPE

Schedule 40

Nominal Pipe Size (in)	O.D.	Average I.D.	Min. Wall	Nominal Wt./ft.	Rating at 73°F, psi
1/4	0.540	0.344	0.088	0.096	780
3/8	0.675	0.473	0.091	0.128	620
1/2	0.840	0.602	0.109	0.190	600
3/4	1.050	0.804	0.113	0.253	480
1	1.315	1.029	0.133	0.371	450
1-1/4	1.660	1.360	0.140	0.502	370
1-1/2	1.900	1.590	0.145	0.599	330
2	2.375	2.047	0.154	0.803	280
2-1/2	2.875	2.445	0.203	1.267	300
3	3.500	3.042	0.216	1.660	260
3-1/2	4.000	3.521	0.226	1.996	240
4	4.500	3.998	0.237	2.363	220
5	5.563	5.016	0.258	2.874	190
6	6.625	6.031	0.280	4.164	180
8	8.625	7.942	0.322	6.268	160
10	10.750	9.976	0.365	8.886	140
12	12.750	11.889	0.406	11.751	130

Schedule 80

Nominal Pipe Size (in)	O.D.	Average I.D.	Min. Wall	Nominal Wt./ft.	Rating at 73°F, psi
1/4	0.540	0.282	0.119	0.117	1130
3/8	0.675	0.403	0.126	0.162	920
1/2	0.840	0.526	0.147	0.238	850
3/4	1.050	0.722	0.154	0.322	690
1	1.315	0.936	0.179	0.473	630
1-1/4	1.660	1.255	0.191	0.654	520
1-1/2	1.900	1.476	0.200	0.793	470
2	2.375	1.913	0.218	1.097	400
2-1/2	2.875	2.290	0.276	1.674	420
3	3.500	2.864	0.300	2.242	370
3-1/2	4.000	3.326	0.318	2.735	350
4	4.500	3.786	0.337	3.277	320
5	5.563	4.768	0.375	4.078	290
6	6.625	5.709	0.432	6.258	280
8	8.625	7.565	0.500	9.506	250
10	10.750	9.493	0.593	14.095	230
12	12.750	11.294	0.687	19.392	230

CPVC Pipe

Operating Temp (°F)	De-Rating Factor
73-80	1.00
90	0.91
100	0.82
110	0.72
120	0.65
130	0.57
140	0.50
150	0.42
160	0.40
170	0.29
180	0.25
200	0.20

De-Rating Example: Determine the maximum allowable operating pressure for a 3" CPVC Schedule 40 piping system with an operating temperature of 140°F. Using de-rating factor of 0.50 for 140°F, multiply pressure rating at 73°F by de-rating factor. A 3 inch CPVC Schedule 40 pipe would = 260 x 0.50 = 130 psi @ 140°F.

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

CPVC Pipe Support Spacing (Ft) at °F (C)

Nominal Pipe Size (in)	Schedule 40						
	60°F (16°C)	100°F (38°C)	120°F (49°C)	140°F (60°C)	160°F (71°C)	180°F (82°C)	200°F (93°C)
1/4	4.5	4.0	3.5	3.5	2.0	2.0	C
3/8	4.5	4.0	4.0	3.5	2.5	2.0	C
1/2	5.0	4.5	4.5	4.0	2.5	2.5	C
3/4	5.5	5.0	4.5	4.0	2.5	2.5	C
1	6.0	5.5	5.0	4.5	3.0	2.5	C
1-1/4	6.0	5.5	5.5	5.0	3.0	3.0	1.5
1-1/2	6.5	6.0	5.5	5.0	3.5	3.0	1.5
2	6.5	6.0	5.5	5.0	3.5	3.0	1.5
2-1/2	7.5	7.0	6.5	6.0	4.0	3.5	1.5
3	8.0	7.0	7.0	6.0	4.0	3.5	2.0
4	8.5	7.5	7.0	6.5	4.5	4.0	2.0
5	9.5	8.5	8.0	7.5	5.0	4.5	2.0
6	9.5	8.5	8.0	7.5	5.0	4.5	2.0
8	10.0	9.0	8.5	8.0	5.0	4.5	2.0
10	10.5	9.5	9.0	8.5	5.5	5.0	2.0
12	11.0	10.0	9.5	9.0	6.0	5.5	2.5

CPVC Pipe Support Spacing (Ft) at °F (C)

Nominal Pipe Size (in)	Schedule 80						
	60°F (16°C)	100°F (38°C)	120°F (49°C)	140°F (60°C)	160°F (71°C)	180°F (82°C)	200°F (93°C)
1/4	4.5	4.0	4.0	3.5	2.5	2.0	C
3/8	5.0	4.5	4.5	4.0	2.5	2.5	C
1/2	5.5	5.0	4.5	4.5	3.0	2.5	C
3/4	5.5	5.5	5.0	4.5	3.0	2.5	C
1	6.0	6.0	5.5	5.0	3.5	3.0	1.5
1-1/4	6.5	6.0	6.0	5.5	3.5	3.0	1.5
1-1/2	7.0	6.5	6.0	5.5	3.5	3.5	2.0
2	7.0	7.0	6.5	6.0	4.0	3.5	2.0
2-1/2	8.0	7.5	7.5	6.5	4.5	4.0	2.5
3	8.0	8.0	7.5	7.0	4.5	4.0	2.5
4	8.5	9.0	8.5	7.5	5.0	4.5	2.5
5	10.0	9.5	9.0	8.0	5.5	5.0	3.0
6	10.0	9.5	9.0	8.0	5.5	5.0	3.0
8	11.0	10.5	10.0	9.0	6.0	5.5	3.5
10	11.5	11.0	10.5	9.5	6.5	6.0	4.0
12	12.5	12.0	11.5	10.5	7.5	6.5	4.5