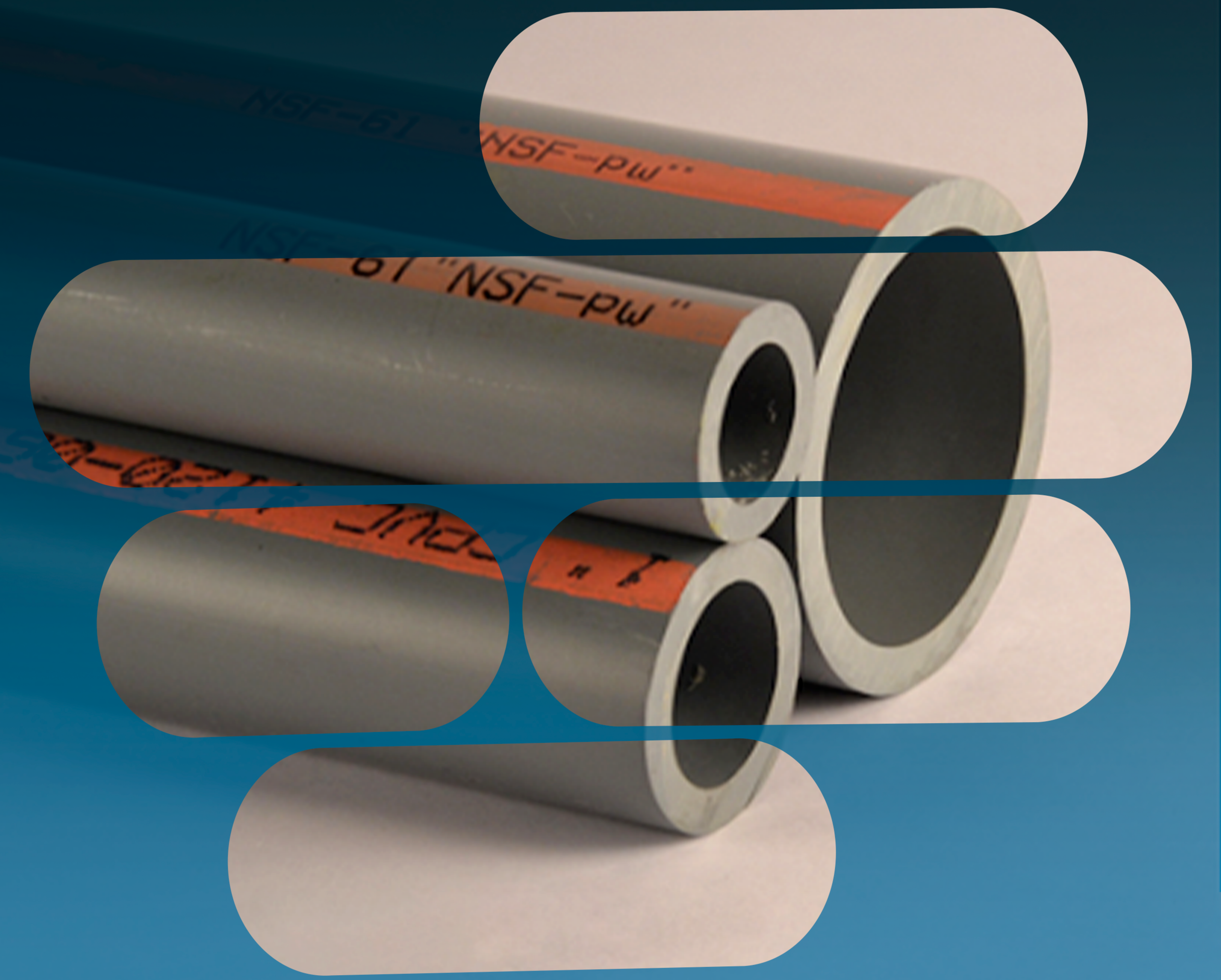
SAPPCO
سابكو

CPVC PIPES

HOT & COLD WATER SYSTEMS



INTRODUCTION

In Saudi Arabia there used to be a time in the past when metal pipes of traditional materials such as galvanized steel and copper have been used for domestic hot and cold water distribution. However, metal pipes have very serious disadvantages of mainly corrosion and consequent costly replacements. To overcome this challenge, CPVC plumbing pipe which has already been adopted in USA and several areas in the region, has been before hand introduced in Saudi Arabia by SAPPCO Since 1988.

CUSTOMER SATISFACTION

SAPPCO CPVC pipe is manufacture from Chlorinated Polyvinyl Chloride compound, Type IV Grade. The CPVC compound has a more rigid chain due to the extra chlorine that increases the maximum operating temperature up to nearly 93°C, leading to fully meet or exceed the material requirements as stated in ASTM D 1784, ASTM F441 / F441 M and as shown in TABLE I below.

TABLE 1: CPVC MATERIAL CHARACTERISTICS

Effects On Water Quality	NSF/ANSI 61	Approved	Listed
Material Classification	ASTM D 1784	Cell Class	23447
Material Designation	ASTM D 1784	Designation	4120-05
Hydrostatic Design Stress	PPI - USA	psi (23 °C)	2000
Hydrostatic Design Stress	PPI - USA	psi (82 °C)	500
Hydrostatic Design Base	PPI - USA	psi (23 °C)	4000

MANUFACTURING STANDARD

ORGANIZATION	STANDARD NUMBER
ASTM	ASTM F 441/F 441M, Schedule 80 ASTM F 442 SDR11

APPLICATIONS

CPVC pipe manufactured by SAPPCO is suitable for hot and cold-water distribution system for use in single and multi household homes, high/low rises buildings, hotels / motels and commercial installations. CPVC pipe is also suitable for industrial processes subject-to corrosive fluids and Chemical Processing Plants.

Main Advantages Of CPVC Pipes

- Longer life.
- Easy handling & installation.
- High temperature resistance.
- Chemical resistance.
- High strength and durability.
- Corrosion resistance.
- Low thermal conductivity.
- Low thermal expansion.

QUALITY MANAGEMENT

SAPPCO has established and applies an upgraded Quality Management System (QMS) and is certified in accordance with EN ISO 9001:2015 the highest standard of quality system and excellence.
SAPPCO control the entire manufacturing process from material to pipe. Routine testing of all pipes produced at the factory is carried out as laid down in the ASTM F 441 in our well-equipped laboratory. Inspection of pipes produced on each machine is carried out ”round the clock” to make sure that exact standard pipe is delivered to our customers.

APPROVAL FROM INDEPENDENT

SAPPCO CPVC pipe is tested, approved and listed by world renowned independent laboratories as an ”APPROVED PRODUCT” suitable for use in contact with Drinking Water (Hot & Cold) and intended for the quality of water. By which meets the strict public health requirements of independent evaluation and assessment authorities. SAPPCO CPVC pipes are tested, approved, and listed by NSF-International (NSF 61).

SAPPCO CPVC pipe is tested, approved, and listed by NSF.

MATERIAL PROPERTIES

Chlorinated Polyvinyl Chloride (CPVC)

TABLE 2: All values are recorded at (73°F) 23°C unless otherwise stated.

PROPERTY	ASTM TEST METHOD	UNIT	VALUE
General Properties:			
Density	D-792 g/cm	g/cm^3	1.55
Water absorption	D-570/24 Hrs	%	0.03
Co-efficient of friction	Hazen-Williams	C (factor)	150
Mechanical Properties:			
Tensile Strength	D-638	MPa	55
Modulus of Elasticity	D-638	MPa	2900
Flexural Strength	D-790	MPa	104
Compressive Strength	D-695	MPa	70
Izod Impact Strength	D-256	J/m	100
Hardness (Rockwell)	D-785	R	119
Thermal Properties:			
Heat Deflection Temp.	D-648 (264 psi)	°C	106
Vicat Softening Temp.	D-1525 (rate B)	°C	127
Co-efficient of Linear Thermal	D-696	cm/(cm°c)	6.3×10^{-5}
Expansion Thermal Conductivity	C-177	$Wm/°k/m^2$	0.14
Flammability Properties:			
Flammability	D-635	Resistance	Self-extinguishing
Rate of burning	D-635	S	< 10
Extent of burning	D-635	mm	< 20
Flammability rating	UL-94/0.062"	Rating	V-0
Electrical Properties:			
Dielectric Strength	D-149	V/cm	492000
Dielectric Constant	D-150 (60HZ/ - 1°C)	Constant	3.7
Power Factor	D-150 (1000HZ)	%	0.007
Volume Resistivity	D-257	ohm/cm	3.4×10^{15}

Chemical Properties:

SAPPCO CPVC pipe has excellent chemical resistance due to strong mineral acids and good Aliphatic Solution bases under the normal conditions. SAPPCO Technical Sales team may be sought out for any query regarding Chemical resistance any time.

SAPPCO CPVC PIPES

TABLE 5: Dimensions based on ASTM D2241 SDR (PRESSURE RATED) SERIES

Nominal Pipe Size	MEAN OUTSIDE DIAMETER		Minimum Wall Thickness		Nominal Weight	Maximmum Working Prssure	
Inch	Inch	mm	Inch	mm	Kg/m	psi	MPa
1/2	0.840	21.3	0.147	3.73	0.337	850	5.86
3/4	1.050	26.7	0.154	3.91	0.457	690	4.76
1	1.315	33.4	0.179	4.55	0.671	630	4.34
1 1/4	1.660	42.2	0.191	4.85	0.928	520	3.59
1 1/2	1.900	48.3	0.200	5.08	1.13	470	3.24
2	2.375	60.3	0.218	5.54	1.56	400	2.76
2 1/2	2.875	73.0	0.276	7.01	2.37	420	2.90
3	3.500	88.9	0.300	7.62	3.18	370	2.55
4	4.500	114.3	0.337	8.56	4.65	320	2.21
6	6.625	168.3	0.432	10.97	8.87	280	1.93
8	8.625	219.0	0.500	12.7	13.5	250	1.72
10	10.750	273.1	0.593	15.06	20.0	230	1.59

NOTE:

- The Maximum pressure rating manifested above is based on water at 23°C and for unthreaded pipe only.
- SAPPCO FlowGuard®, nominal size from 1/2” to 2” are supplied with red stripe marking.
- SAPPCO CPVC pipes, nominal size from 2 1/2”to10” are supplied with no stripe marking.
- IMPA = 1000 KPa = 145 psi = 10 BAR = 102 kg/cm2 = IN/mm2 = 0.987 atm.

Table 4: Dimensions based on ASTM F 442 AMERICAN STANDARD - SDR11

SIZE	OUTSIDE DIAMETER	WALL THICKNESS	Weight
inch	mm	mm	Kg/M
1/2	21.2	1.93	0.204
3/4	26.6	2.41	0.312
1	33.27	3.02	0.481
1 1/4	42.07	3.84	0.760
1 1/2	48.15	4.39	0.990
2	60.15	5.49	1.545

NOTE:
Working Pressure 400 PSI at 23°C , 100 PSI at 82 °C.

EFFECT OF ELEVATED TEMPERATURE

Maximum working pressure shown in TABLE 3 and 4 is rated for use with potable water at 23°C. To determine pressure at elevated temperature, multiply (23°C) maximum working pressure by appropriate derating safety factor as stated in Table 4 below.

TABLE 5: Derating Factors For CPVC Pipe

Working/Elevated Temperature	°F	73-80	90	100	120	140	160	180	200
	°C	23-27	32	38	49	60	71	82	93
Derating Safety Factors Suitable at elevated temp	Factor	1.0	0.91	0.82	0.65	0.50	0.40	0.25	0.20

COLOUR OF PIPE

GREY.

LENGTH OF PIPE

Standard 6 meters (Other lengths may be customized upon request).

JOINT OF PIPE

Plain ends (Without socket).

SAPPCO CPVC (SCH 80) PIPE & FITTINGS JOINING PROCESS

1. CUTTING

CPVC pipe can be easily cut with a wheel-type pipe cutter or other fine toothed hand or power saw. Cutting pipe as squarely as possible provides optimal bonding area within the joint. If any indication of damage or cracking is evident at the pipe end, cut of at least 2 inches (5cm) beyond that or any visible crack.

2. DEBURRING/BEVELING

Burrs and Filings can prevent proper contact between pipe and fitting during assembly and should be removed from the outside and inside of the pipe.

3. FITTING PREPARATION

Wipe any dirt or moisture from the fitting sockets and pipe end. Check the dry fit of the pipe and fitting. The pipe should make contact with the socket wall 1/3 to 2/3 of the way into the fitting socket. At this stage, pipe should not bottom out in the socket.

4. PRIMER/CLEANER APPLICATION

Primer or cleaner prepares the bonding area for the application of cement and subsequent assembly. It is important to use a proper applicator.

5. SOLVENT CEMENT APPLICATION

USE ONLY CPVC CEMENT CONFORMING TO ASTM F-493, UNLESS OTHERWISE JOINT FAILURE MAY RESULT. When the primed pipe and fitting surfaces are dry, apply a heavy, even coat of cement on the pipe end. Apply a thin coat inside the fitting socket.

6. ASSEMBLY

Immediately insert the pipe into the fitting socket, while rotating the tube 1/4 to 1/2 turn during insertion. This motion ensures an even distribution of cement within the joint. Properly align the fitting. Hold the assembly for approximately 10 seconds, allowing the joint to setup. An even bead of cement should be evident around the joint. If this bead is not continuous around the socket edge, it may indicate that insufficient cement was applied. In this case, remake the joint to avoid potential leaks. Wipe excess cement from the pipe and fittings surfaces for an attractive appearance and a professional finish.

FITTINGS

SAPPCO supply suitable fittings - for jointing CPVC pipes systems - made by not only our associated company APLACO, but other renowned fittings manufacturers as well. These fittings conform to the following standards:
ASTM F 439 : CPVC Plastic Pipe Fittings, Schedule 80.
ASTM F 437: Threaded CPVC Plastic Pipe Fittings, Schedule 80.

STORAGE AND HANDLING

CPVC pipe should be shaded but not covered directly when stored outdoor. This will provide for free circulation of air and reduce the heat build-up due to direct sunlight exposure. Care should be taken while handling to avoid dragging, scratching and dropping against sharp objects. Pipe ends should be inspected for cracks resulting from abuse which should be cut and discarded.

CUSTOMER SATISFACTION

Our most key objective "Customer Satisfaction" is achieved with the comprehensive provision of high-quality products and services and as a leader in the plastic pipe industry, SAPPCO:

- Continuous evaluation and improvement of the process.
- Modernize manufacturing extrusion system Equipment.
- It's well experienced staff offer extensive industry knowledge and field experience in thermoplastic piping products to it's valued customers.

HYDRAULIC TESTING OF PIPELINE

The pressure testing of pipeline shall be conducted with water at interval initially not exceeding 500 meters, and subsequently not exceeding 1000 meters. Pipe should be adequately anchored to prevent movement during the testing process. The joint and the pipeline should be slowly filled with clean water while taking care to prevent surge and air entrapment. All entrapped air must be purged from the line before applying pressure. All air release valves should be installed at high points, and a further precaution against air entrapment is to pass a foam swab through the pipeline. The passage of foam swab will additionally clean the line of any debris left during laying.

The temperature of test water should preferably be maximum 23°C. When testing above 23°C, it advisable to use safety factor given in Table 4 on page 4 in this catalogue.

The test pressure and duration shall meet the requirements of local regulations where applicable.

The line should be pressurized to 1.5 times of the system design operating pressure, but neither less than 15 psi nor in excess of the pressure rating for pipe or appurtenances. Measure the pressure at the lowest elevation possible.

The duration of pressurization shall preferably be 1 hour but not to exceed 3 hours.

All visible leaks or any leak in excess of the permitted variation should be repaired and the pipeline retested following the same procedure.

Important Notes:

1. Pipeline system should be designed and constructed to avoid excessive water hammer/ surge pressure.
2. Air must be purged completely from pipelines before applying pressure.
3. Joint must be covered and protected from heat and UV particularly in the mid-day time.
4. Allow 24 hours for line test pressure, with pipe sizes up to 1 1/2 in, it is possible to reduce the time, or 8 hours to elapse before working pressure.
5. In hot weather, pressure test in early morning is recommended.

WARNING	
	• NEVER use compressed air or gas in CPVC pipeline. • NEVER test CPVC pipe and fittings with compressed air or gas. • ONLY use CPVC pipe for water and approved chemicals. Use of compressed air or gas in CPVC pipe and fittings can result in explosive failures and cause severe injury or death.

CERTIFICATES & APPROVALS

NSF

WRAS

TÜV AUSTRIA

TÜV NORD CERT GmbH ISO 9001

WRAS

SASO QUALITY MARK

GS1 Saudi Arabia

Low VOC

GENERAL CERTIFICATES & APPROVALS

SAPPCO
سابكو

50 YEARS OF HISTORY..

Built to Sustain..

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