CPVC PIPEMASTER™

KEGUNAAN DAN APLIKASI

- ✓ CHEMICAL PROCESSING: CAIRAN ZAT KIMIA KUAT DAN LEMAH (ASAM, BASA, ASIN)
- ✓ WASTE WATER TREATMENT: LIMBAH AIR PEMBUANGAN MENGANDUNG ZAT KIMIA
- ✓ POWER GENERATION: DISTRIBUSI FLUIDA PADA POWER PLANT
- ✓ MARINE: PEMIPAAN PADA PERKAPALAN TAHAN KARAT TERHADAP AIR LAUT
- ✓ PLUMBING: DISTRIBUSI AIR BERSIH (23°C), AIR PANAS (95°C) DAN AIR MINUM PORTABLE
- ✓ HVAC: DISTRIBUSI AIR DINGIN (4°C) UNTUK SISTEM CHILLER DAN COOLING TOWER

SPECIFICATIONS

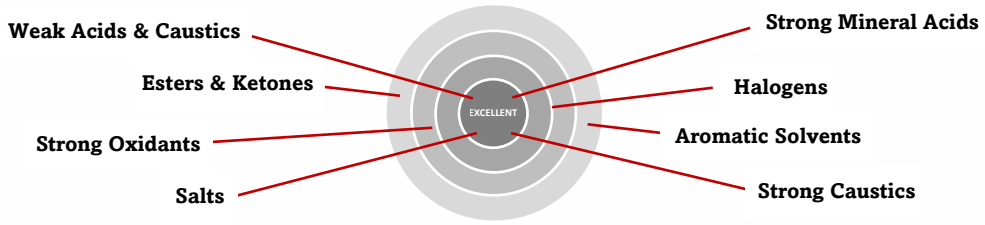
CLASSIFICATION	DESCRIPTIONS
Pipe	Chlorinated Polyvinyl Chloride ASTM F441 / NSF SE 8459, Class Sch.40 and Sch.80
Fittings	CPVC Injection Moulded Sanitary fittings, Solvent Cement joint type: 1. ASTM F438 Standard Specification for CPVC Pipe Fittings, Sch.40 2. ASTM F439 Standard Specification for CPVC Pipe Fittings, Sch.80 3. ASTM F437 Standard Specification for Threaded CPVC Plastic Pipe Fittings, Sch.80 4. NSF SE 8458 Standard Specification for CPVC Brass Transition Fittings
Solvent Cement and Connection	1. ASTM F493 Standard Specification for Solvent Cements for CPVC Pipe & Fittings. 2. ASTM F3328 Standard Practice for the One Step Method of CPVC Joint 3. ASTM D2855 Standard Practice for the Two Step Method of CPVC Joint
Requirement for Water and Chemical Distribution	1. NSF SE 8459 CPVC Schedule 40 & 80 Pipe and Fitting with High HDB at 180° F. 2. NSF Standard 14, Plastic Piping Components and Related Materials. 3. NSF Standard 61, Drinking Water System Components – Health Effects. 4. ASTM F2618 Standard Specification for CPVC Pipe and Fittings for Chemical Waste Drainage Systems 5. ASTM D543 Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents

BASIC PHYSICAL PROPERTIES

Property	Test	Condition	English Units	SI Units
GENERAL				
Specific Gravity	ASTM D792	73°F / 23°C	1.55g/cm³	23447-B
Specific Volume		73°F / 23°C	0.645cm³ /g	0.645cm³ /g
Water Absorption	ASTM D570	73°F / 23°C	+0.03%	+0.03%
		212°F / 100°C	+0.03%	+0.03%
Rockwell Hardness	ASTM D785	73°F / 23°C	119	
Cell Class	ASTM D1784		23447-B	
MECHANICAL				
Izod Impact	ASTM D256	73°F / 23°C	1.5ft lbs / ino.n	80J/mo.n
Tensile Strength	ASTM D638	73°F / 23°C	8000psi	55N/mm2
Tensile Modulus	ASTM D638	73°F / 23°C	360,000psi	2500N/mm2
Flexural Strength	ASTM D790	73°F / 23°C	15,100psi	104N/mm2
Flexural Modulus	ASTM D790	73°F / 23°C	415,000psi	2860N/mm2
Compressive Strength	ASTM D695	73°F / 23°C	10,100psi	70N/mm2
Compressive Modulus	ASTM D695	73°F / 23°C	10,100psi	1350N/mm2
THERMAL				
Coefficient of Thermal Expansion	ASTM D696		3.4x10'5in/in/°F	6.3x10-5m/m.°K
Thermal Conductivity	ASTM C177		0.95BTU in/hr/ft2/T	0.137W/m.°K
Heat Distortion Temperature	ASTM D648		217T	103°C
Heat Capacity	DSC	73°F / 23°C	0.21BTU/1bT	0.90J/g.°K
		212°F / 100°C	0.26BTU/1bT	1.10J/g.°K
FLAMMABILITY				
Flammability Rating	UL 94	0.062in/0.157cm	V-0,5VB,5VA	
Flame Spread	ASTM E84		15	
Smoke Developed	ASTM E84		70-125	
Limiting Oxygen Index	ASTM D2863		60%	
ELECTRICAL				
Dielectric Strength	ASTM D147		1250V/mil	492,000V/cm
Dielectric Constant	ASTM D150	60Hz, 30oF/-1°C	3.7	3.70
Power Factor	ASTM D150	1000Hz	0.01%	0.007%
Volume Resistivity	ASTM D257	73°F / 23°C	3.4 x 1015ohm/cm	3.4 x 1015ohm/cm

EXCELLENCE CHEMICAL RESISTANCE

CPVC advanced industrial piping systems are chemically inert to most mineral acids, bases and salts, as well as aliphatic hydrocarbons. In addition, these systems are not subject to galvanic corrosion. If any questions about the chemical resistance, please refer to our chemical resistance data or consult with us for your special anticorrosion requirement.



FIREPROOFING PROPERTIES

- **Ignition Resistance**
  CPVC has a flash ignition temperature of 900°F which is the lowest temperature at which sufficient combustible gas is evolved to be ignited by a small external flame. Many other ordinary combustibles, such as wood, ignite at 500°F or less.

- **Burning Resistance**
  CPVC will not sustain burning. It must be forced to burn due to its very high Limiting Oxygen Index (LOI) of 60. LOI is the percentage of oxygen needed in an atmosphere to support combustion. Since Earth's atmosphere is only 21% oxygen, CPVC will not burn unless a flame is constantly applied and stops burning when the ignition source is removed. Other materials will support combustion due to their low LOI.

- **Heat Combustion**
  CPVC has a flash ignition temperature of 900°F which is the lowest temperature at which sufficient combustible gas is evolved to be ignited by a small external flame. Many other ordinary combustibles, such as wood, ignite at 500°F or less

WEATHERABILITY

Weatherability is defined as a material's ability to maintain its basic physical properties after prolonged exposure to sunlight, wind and rain/humidity. CPVC has been blended with a titanium dioxide (TiO2) and carbon black. TiO2 coupled with carbon black is widely recognized as an excellent ultraviolet blocking agent and helps to protect the polymer backbone from the effects of ultraviolet radiation. Therefore, CPVC piping system will be able to meet the requirements of most outdoor installations. If the specific installation requires additional protection from UV exposure, CPVC piping system can be painted with common acrylic latex paint. Priming of the piping is not necessary prior to painting.

BIOLOGICAL RESISTANCE

CPVC industrial piping systems are resistant to attack from fungi. Fungus growth on plastics is supported when plasticizers or other additives are present for the fungus to feed on. CPVC contains no additives which would provide a nutrient source for fungi. Bacteria are encountered in nearly all situations where water is present. The smooth interior surface of CPVC industrial piping provides fewer footholds for bacteria to take hold and multiply. CPVC industrial piping systems are resistant to the action of all forms of bacteria, many of which are known to cause corrosion in metal piping systems, such as iron-oxidizing bacteria, sulfate-reducing bacteria, and acid-producing bacteria. CPVC is also resistant to most commonly used biocidal chemicals.

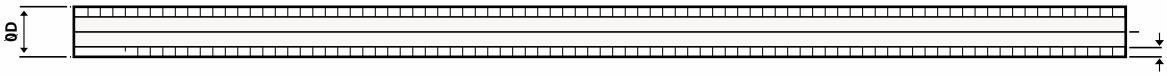
THERMAL CONDUCTIVITY

CPVC industrial piping has a very low thermal conductivity value, approximately 1/300th that of steel. A prudent practice to ensure worker safety is to insulate pipes which have exterior surface temperatures greater than 140°F. Because metal pipes have such a high thermal conductivity, the exterior surface temperature is approximately equal to the temperature of the fluid being conveyed. Therefore, pipes carrying fluids at temperatures of 140°For more should be insulated if there is the possibility of worker contact. This generates more cost in the initial installation of a system and makes periodic inspections of the pipe more difficult. Because CPVC has a much lower thermal conductivity, the surface temperature of CPVC pipe is significantly lower than the internal fluid temperature. Insulation is therefore often not needed on CPVC industrial pipe.
CPVC's low thermal conductivity also means that energy in the process stream is conserved. The rate of heat transfer through CPVC piping is typically 50-60% that of steel piping.

TEMPERATURE DERATING FACTORS

Operation Temperature	°F	73-80	90	100	120	140	160	180	200
	°C	22.5-26.7	32.2	37.8	48.9	60.0	71.1	82.2	93.3
Derating Factor		**1.00**	**0.91**	**0.82**	**0.65**	**0.50**	**0.40**	**0.25**	**0.20**

PRODUCT DIMENSION AND STANDARD



PRESSURE PIPE – CPVC 4120 Standard ASTM F441 Class SCH80

Nominal Size		OD (mm)	WT (mm)	Water Pressure Rating at 23°C	
In	mm				
1/2	15	21.3	3.73	59.76	Bar
3/4	20	26.7	3.91	48.51	Bar
1	25	33.4	4.55	44.29	Bar
1-1/4	32	42.2	4.85	36.56	Bar
1-1/2	40	48.2	5.08	33.04	Bar
2	50	60.3	5.54	28.12	Bar
2-1/2	65	73.0	7.01	29.53	Bar
3	80	88.9	7.62	26.01	Bar

Nominal Size		OD (mm)	WT (mm)	Water Pressure Rating at 23°C	
In	mm				
4	100	114.3	8.56	22.50	Bar
5	125	141.3	9.52	20.39	Bar
6	160	168.3	10.97	19.69	Bar
8	200	219.1	12.70	17.58	Bar
10	250	273.1	15.06	16.17	Bar
12	300	323.9	17.45	16.17	Bar
14	350	355.6	19.05	15.47	Bar
16	400	406.4	21.14	15.47	Bar

Note:

1. *CPVC pipes class 40 standard ASTM F441 available with minimal order requirement*
2. *CPVC pipes class PN10/PN16 standard DIN EN ISO 15493 applicable for optional requirement*
3. *CPVC Pipes dimension 18 Inch (DN450) to 48 Inch (DN1200) non-standard size available as customers inquiry*

CPVC ELBOW 90° (KNEE 90°)

Illustration	Classification	Descriptions
	Standard	ASTM F439
	Class	SCH80
		PN10/PN16 (Optional)
	Grade	Industrial
	Size Range	DN15 ~ DN400
		1/2 Inch ~ 16 Inch

CPVC COUPLING (SOCKET)

Illustration	Classification	Descriptions
	Standard	ASTM F439
	Class	SCH80
		PN10/PN16 (Optional)
	Grade	Industrial
	Size Range	DN15 ~ DN400
		1/2 Inch ~ 16 Inch

CPVC ELBOW 45° (KNEE 45°)

Illustration	Classification	Descriptions
	Standard	ASTM F439
	Class	SCH80
		PN10/PN16 (Optional)
	Grade	Industrial
	Size Range	DN15 ~ DN400
		1/2 Inch ~ 16 Inch

CPVC STRAIGHT TEE (EQUAL TEE)

Illustration	Classification	Descriptions
	Standard	ASTM F439
	Class	SCH80
		PN10/PN16 (Optional)
	Grade	Industrial
	Size Range	DN15 ~ DN400
		1/2 Inch ~ 16 Inch

CPVC END CAP (DOP)

Illustration	Classification	Descriptions
	Standard	ASTM F439
	Class	SCH80
		PN10/PN16 (Optional)
	Grade	Industrial
	Size Range	DN15 ~ DN250
		1/2 Inch ~ 10 Inch

CPVC UNION (WATERMOOR)

Illustration	Classification	Descriptions
	Standard	ASTM F439
	Class	SCH80
		PN10/PN16 (Optional)
	Seal	EPDM / FPM
	Grade	Industrial
	Size Range	DN15 ~ DN400
		1/2 Inch ~ 4 Inch

Note: *CPVC fittings dimension 18 Inch (DN450) to 48 Inch (DN1200) non-standard size available as customers inquiry*

CPVC REDUCING TEE

Illustration	Classification	Descriptions
	Standard	ASTM F439
	Class	SCH80
		PN10/PN16 (Optional)
	Grade	Industrial
	Size Range	DN15 ~ DN400
		1/2 Inch ~ 16 Inch

CPVC REDUCING COUPLING

Illustration	Classification	Descriptions
	Standard	ASTM F439
	Class	SCH80
		PN10/PN16 (Optional)
	Grade	Industrial
	Size Range	DN15 ~ DN400
		1/2 Inch ~ 16 Inch

CPVC REDUCING BUSHING

Illustration	Classification	Descriptions
	Standard	ASTM F439
	Class	SCH80
		PN10/PN16 (Optional)
	Grade	Industrial
	Size Range	DN15 ~ DN400
		1/2 Inch ~ 16 Inch

CPVC Y BRANCH

Illustration	Classification	Descriptions
	Standard	ASTM F439
	Class	SCH80
		PN10/PN16 (Optional)
	Grade	Industrial
	Size Range	DN40 ~ DN400
		1-1/2 Inch ~ 16 Inch

CPVC TEE CROSS

Illustration	Classification	Descriptions
	Standard	ASTM F439
	Class	SCH80
		PN10/PN16 (Optional)
	Grade	Industrial
	Size Range	DN15 ~ DN400
		1/2 Inch ~ 16 Inch

CPVC BRASS FEMALE ELBOW ADAPTOR

Illustration	Classification	Descriptions
	Standard	ASTM F437
	Class	SCH80
		PN10/PN16 (Optional)
	Grade	Industrial
	Size Range	DN15 ~ DN50
		1/2 Inch ~ 2 Inch

CPVC MALE THREAD ADAPTOR

Illustration	Classification	Descriptions
	Standard	ASTM F437
	Class	SCH80
		PN10/PN16 (Optional)
	Grade	Industrial
	Size Range	DN15 ~ DN100
		1/2 Inch ~ 4 Inch

CPVC FEMALE THREAD ADAPTOR

Illustration	Classification	Descriptions
	Standard	ASTM F437
	Class	SCH80
		PN10/PN16 (Optional)
	Grade	Industrial
	Size Range	DN15 ~ DN100
		1/2 Inch ~ 4 Inch

CPVC OPEN FLANGE

Illustration	Classification	Descriptions
	Standard	ASTM F439
	Class	SCH80 / ANSI150
		PN10/PN16 (Optional)
	Grade	Industrial
	Size Range	DN15 ~ DN400
		1/2 Inch ~ 16 Inch

CPVC BLIND FLANGE

Illustration	Classification	Descriptions
	Standard	ASTM F439
	Class	ANSI150
		PN10/PN16 (Optional)
	Grade	Industrial
	Size Range	DN15 ~ DN400
		1/2 Inch ~ 16 Inch

Note: *CPVC fittings dimension 18 Inch (DN450) to 48 Inch (DN1200) non-standard size available as customers inquiry*

CPVC TRUE UNION BALL VALVE

Illustration	Classification	Descriptions
	Standard	ASTM F439
	Class	SCH80
		PN10/PN16 (Optional)
	Seal	EPDM / FPM
	Grade	Industrial
	Size Range	DN15 ~ DN100
		1/2 Inch ~ 4 Inch

CPVC BUTTERFLY VALVE

Illustration	Classification	Descriptions
	Standard	ASTM F439
	Class	SCH80
		PN10/PN16 (Optional)
	Seal	EPDM / FPM
	Grade	Industrial
	Size Range	DN15 ~ DN250
		1/2 Inch ~ 10 Inch

CPVC ADHESIVE – Standard ASTM F493, NSF/ANSI 14 & 61

Type	Colour	Size	Dimension Usage Range
CPVC Solvent Cement – Heavy Body	Gray	473 mL	1/2" (15 mm) – 16" (400 mm)
CPVC/PVC Primer – Water Thin	Purple	473 mL	1/2" (15 mm) – 16" (400 mm)

INSTALLATION

1. PIPE CUTTING

- Cut pipe square. As joints are sealed at the base of the fitting socket. An angled cut may result in joint failure.
- Acceptable tools include mitre saw, Mechanical cut off saw or wheel cutter. Wheel type cutters must employ a blade

2. REMOVE BURR & BEVEL

- Remove all burrs from inside and outside of pipe with a knife-edge, file or deburring tool Chamfer (bevel) the end of the pipe 10°-15°.
- Remove surface dirt, grease or moisture with a clean dry cloth.
- With light pressure, pipe should go one third to one half of the way into the fitting socket. Pipes and Fittings that are too tight or too loose should not be used.

3. SOLVENT CEMENT APPLICATION

- Apply medium layer of cement Inside the Fitting and apply full even layer Outside of Pipe.
- Use an applicator that is one half the pipe diameter.
- Too large an applicator will force excessive cement in to the inner side surface of small diameter fittings.
- Too small applicator will not apply sufficient cement to large diameter systems.

4. JOINT PIPE & FITTING

- Assemble pipe and fitting socket till it contacts socket bottom. Give pipe a quarter turn. Hold the pipe and Fitting together until the pipe does not back out.
- Remove excessive cement from the exterior. A properly made joint will show a continue bead of cement around the perimeter.
- Observe all safety precautions.

Follow manufacturer's instructions for all related products and installation

PROJECT REFERENCE

No.	Project Name	System	Location
1	Nestle Indonesia Karawang Factory	Chemical & Hot Water Drainage	Jawa Barat
2	Nestle Indonesia Bandaraya Factory	Chemical & Hot Water Drainage	Jawa Tengah
3	Gulbrandsen Technologies Indonesia	Chemical Processing & Distribution	Jawa Barat
4	Ajinomoto – Saori Factory	Chemical & Hot Water Drainage	Jawa Barat
5	GTN Data Center	Hot & Cold Water	Jawa Barat
6	Sanpo Rubber Indonesia Factory	Chemical & Hot Water Drainage	Jawa Barat
7	Alba Tridi Plastic Recycling Factory	Chemical & Hot Water Drainage	Jawa Tengah
8	Mayora Factory Jayanti 3	Chemical & Hot Water Drainage	Banten