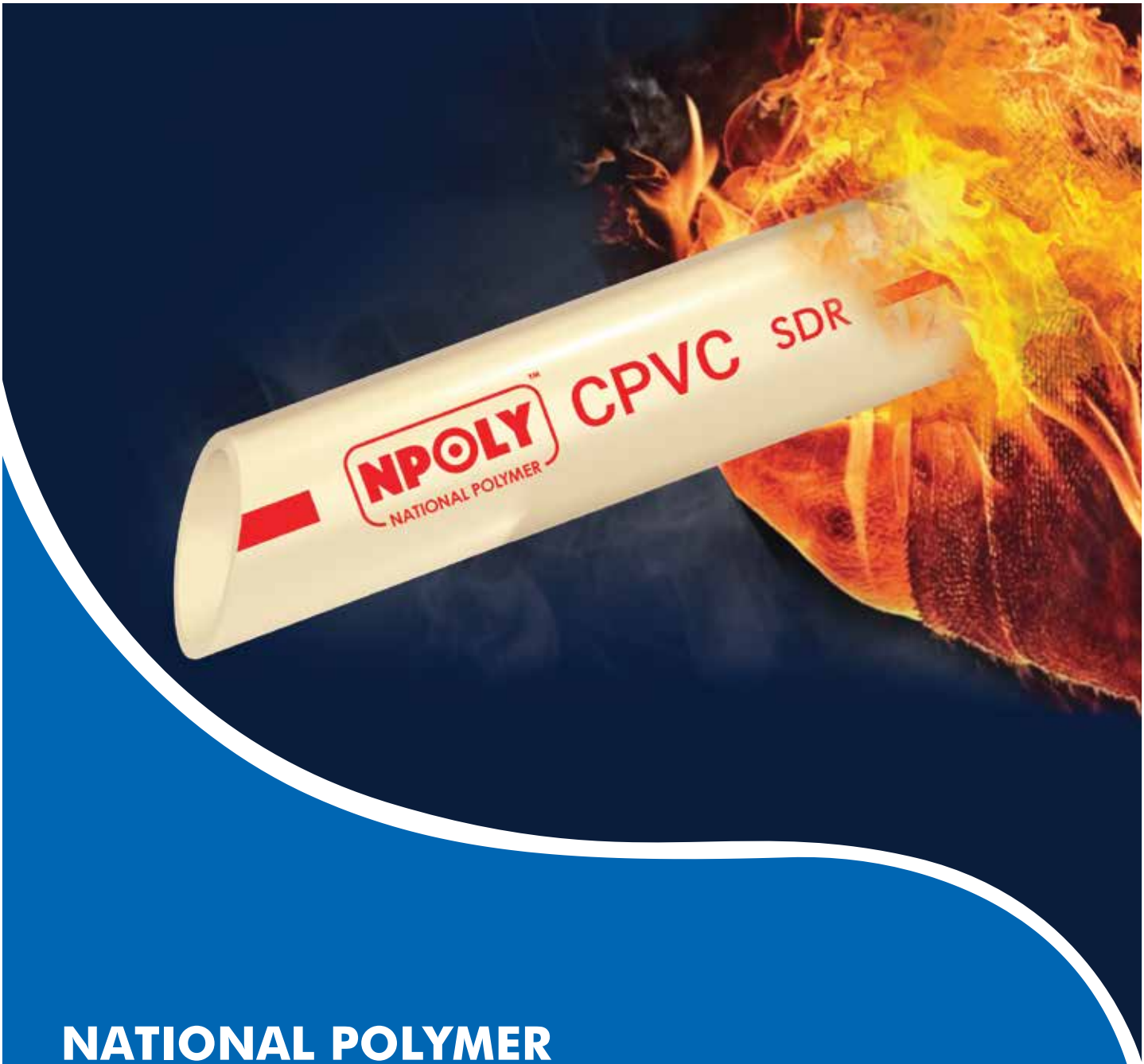
NPOLYGUARD
CPVC
PIPE & FITTINGS
HOT AND COLD
WATER DISTRIBUTION SYSTEM

NPOLY™
PIPE & FITTINGS



NATIONAL POLYMER

Always a step ahead in Plastics Technology

TEST REPORT OF CPVC PIPE

THE FUTURE OF COMPANY BRANDING

BUET TEST REPORT

যন্ত্রকৌশল বিভাগ
বাংলাদেশ প্রকৌশল বিশ্ববিদ্যালয়
ঢাকা-১০০০, বাংলাদেশ
024492

Department of Mechanical Engineering
Bangladesh University of Engineering and Technology
Dhaka-1000, Bangladesh

TEST REPORT OF CPVC PIPES

30 January 2023

CLIENT	:	MR. MD. MAHMUDUL ISLAM EXECUTIVE DIRECTOR NATIONAL POLYMER INDUSTRIES LTD. NPOLY HOUSE: GA-99/3, PRAGATI SHORONI MIDDLE BADDA, DHAKA-1212
CLIENT'S REFERENCE	:	NPOLY/CPVC/PIPES/HQ/2023/01; Dated: 01.01.2023
UNIVERSITY REFERENCE	:	BRTC No.: 1102-79770/ME/22-23; Dated: 01.01.2023
SAMPLES SUPPLIED	:	1. 0.75" dia CPVC Pipe, SDR-11 2. 1.0" dia CPVC Pipe, SDR-13.5
BRNAD NAME	:	National Polymer Industries Ltd.
SAMPLE RECIEVED	:	Unsealed & Unsigned
TEST CONDUCTED BY	:	DEPARTMENT OF MECHANICAL ENGINEERING BUET, DHAKA-1000.

TEST RESULTS

DIMENSION TEST
Standard Used: ASTM-D2846

Sample ID	Outside dia. (mm)			Wall thickness (mm)			Remarks
	Max.	Min.	Mean	Max.	Min.	Mean	
0.75" dia CPVC Pipe, SDR-11	22.35	22.25	22.29	2.16	2.03	2.08	Conforms to the requirement of the standard
1.0" dia CPVC Pipe, SDR-13.5	28.72	28.55	28.70	2.73	2.62	2.70	Conforms to the requirement of the standard

HYDROSTATIC PRESSURE TEST
Standard Used: ASTM D-2846

Sample Identification	Test Temp. and Duration	Applied Pressure (psi)	Observations
0.75" dia CPVC Pipe, SDR-11	23°C, 1 hr.	400	Conforms to the requirement of the standard
0.75" dia CPVC Pipe, SDR-11	23°C, 1 hr.	100	Conforms to the requirement of the standard
1.0" dia CPVC Pipe, SDR-13.5	82°C, 1 hr.	320	Conforms to the requirement of the standard
1.0" dia CPVC Pipe, SDR-13.5	82°C, 1 hr.	80	Conforms to the requirement of the standard

IZOD IMPACT TEST
Standard Used: ASTM D256*

Sample ID	Measured Izod Impact (J)	Average Izod Impact (J)
0.75" dia CPVC Pipe, SDR-11	17.5, 22.8, 25.0, 25.0	22.6
1.0" dia CPVC Pipe, SDR-13.5	28.4, 36.4, 37.6, 41.1	35.9

* Composite specimens have been used due to the dimensional limitation of the supplied samples and some laboratory practices have been adopted.

RESISTANCE TO ACETONE TEST
Standard Used: BS 3505 : 1986

Sample Identification	Observations	Remarks
0.75" dia CPVC Pipe, SDR-11	No delamination or disintegration was observed	Conforms to the requirement of the standard
1.0" dia CPVC Pipe, SDR-13.5	No delamination or disintegration was observed	Conforms to the requirement of the standard

Professor and Head
Mechanical Engg. Dept.
BUET, Dhaka-1000
Bangladesh

INTRODUCTION

NPOLY is very proud to introduce CHLORINATED POLY VINYL CHLORIDE [CPVC] for the first time in Bangladesh. Under the brand name "NPOLY FlowGuard CPVC." It is also manufacturing Industrial Piping System under brand name NPOLY CPVC. It has a techno commercial joint venture with specialty Process LLC, USA, the world leader of manufacturing FlowGuard CPVC Pipes and Fittings in USA since last 28 Years.

NPOLY FlowGuard pipes and fittings, manufactured by National Polymer Industries Ltd, are made from the specialty plastic, chemically known as Chlorinated Poly Vinyl Chloride [CPVC]. This CPVC compound shall meet cell class 23447 B as defined by ASTM D1784 and have a design stress of 2000 PSI and a maximum service temperature up to 93°C.

Pipes are produced in copper tube size (CTS) from 15 mm (½") to 50 mm (2") with two different standard dimensional ratios - SDR-11 and SDR-13.5. The fittings are produced as per SDR 11. All NPOLY CPVC SDR 11 and SDR 13.5 pipes are made from identical CPVC compound material having same physical properties. The CPVC fittings are manufactured from compound material which meets all the requirements as per ASTM standards. CPVC pipes of Copper Tube Size (CTS) dimensions an also be applied to CPVC (IPS) dimensions by using IPS x CTS fittings.

The CPVC pipes from 15 mm (½") to 50 mm (2") are also produced as per IS 15778 standard in both classes that is Class 1 (SDR 11) and Class 2 (SDR 13.5). Apart from having the same physical properties, SDR 11 and SDR 13.5 which are having different wall thicknesses and therefore, at any given temperature, they have different pressure ratings. For e.g.

Pipe	Temperature (°C)	Pressure Rating (PSI)	(Kg/Cm²)
SDR 11	23 82	400 100	28.1 7.00
SDR 13.5	23 82	320 80	22.5 5.6

NPOLY also produces FlowGuard pipes as iron pipe size (IPS), available sizes are 65 mm (2½") to 150 mm (6") in SCH 40 and SCH 80 which meets the requirements of ASTM F 441. The pressure ratings vary with schedule pipe size and temperature.

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STANDARDS & SPECIFICATIONS:

ASTM D1784 – Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly Vinyl Chloride (CPVC) Compounds.

ASTM D2846 – Specification for Chlorinated Poly Vinyl Chloride (CPVC) Plastic Hot & Cold water distribution systems.

ASTM F493 – Standard Specification for Solvent Cements for Chlorinated Poly Vinyl Chloride (CPVC) Plastic Pipe & Fittings.

ASTM F441 – Standard Specification for Chlorinated Poly Vinyl Chloride (CPVC) Plastic Pipe, SCH 40 & 80.

ASTM F438 : Socket-Type Chlorinated Polyvinyl Chloride Plastic Pipe Fittings. Schedule 40.

ASTM F439 : Socket-Type Chlorinated Polyvinyl Chloride Plastic Pipe Fittings. Schedule 80.

ASTM D2774 : Underground installation of Thermoplastic pipes.

MARKING AND UNIFORMITY: Pipes and fittings made from CPVC compound shall be marked with the manufacturer's trademark, material designation, applicable ASTM standard.

SDR 11 Pipe : Tan coloured with red stripe
SDR 11 fittings : Tan colour
SDR 13.5 Pipe : Tan coloured with red stripe
SDR 11 fittings : Tan colour
SCH 40 Pipe : Tan colour
SCH 40 fittings : Tan colour
SCH 80 Pipe : Tan colour
SCH 80 fittings : Tan colour

FIELDS OF APPLICATIONS: Hot and Cold water applications in homes, apartments, hotels, resorts, hospitals, high and low rise buildings, corporate and commercial houses, academic institutes etc. for pure and hygienic water supply.

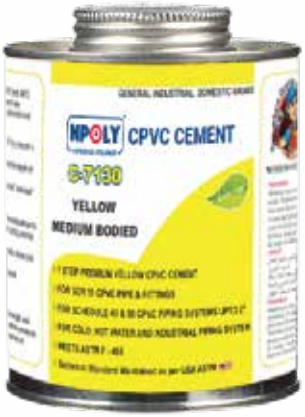
WHY **FlowGuard** PIPES AND FITTINGS ARE THE BEST CHOICES FOR HOT AND COLD POTABLE WATER DISTRIBUTION?

NPOLY FlowGuard CPVC piping system has a winning edge over any other piping system. Here are few parameters which make NPOLY FlowGuard hot and cold water plumbing systems stand as best in comparison to any other outdated plumbing system…

• **THE RAW MATERIAL:** FlowGuard™ is a Hot and Cold Potable Water Distribution System made of chlorinated polyvinyl chloride (CPVC) for use in single and multi-family homes, apartments, high-rises, hotel/motels, and commercial installations. FlowGuard™ CPVC has been used for hot and cold water distribution in the United States since 1960. It has a history of superior performance and competitive prices compared to metal and other alternative piping systems. CPVC pipe and fittings are joined by solvent cementing which, through chemical bonding, essentially makes the pipe and fitting become one continuous piece. Flowguard™ CPVC meets the requirements of both ANSI/NSF standard 14-plastic piping system components and related materials and standard 61- Drinking Water System components- health effect. Included in these tests, are strict standards and strict toxicological reviews relating to chemical extraction products, taste and odor produced in the water by the piping system.

These tests ensure that all Environmental Protection Agency (EPA) standards for safe drinking water are met by the CPVC piping system.

• **NSF APPROVED SOLVENT CEMENT:**
All Weld-On solvent cement, primers and cleaners meet the requirements for low VOC (volatile organic compound) emission limits established by California South Coast Air Quality Management District (SCAQMD), one of the USA's strictest air quality regulatory bodies. Low VOC emissions contribute to cleaner air.



NPOLY CPVC cement provides the following benefits:

• High-quality performance with excellent installation properties.

• User friendly. Reduced fumes and odor for the comfort and well-being of pipe installers.

• NSF, UPC and/or CSA Listed.*

• Meet ASTM Standards for solvent cement used for plastic pipe installation.*

• Environmentally Responsible. LEED® Compliant (Leadership in Energy and Environmental Design).**

* Refer to individual solvent cement for specific ASTM standard, NSF, UPC and/or CSA listings.

** LEED Green Building Rating System For New Construction & Major Credit 4.1 Low-Emitting Materials - Adhesives & Sealants)

NPOLY recommends NSF-approved IPS weld-on solvent cement for reliable and leakproof joints between CPVC pipes and fittings.

BASIC PHYSICAL PROPERTIES

PROPERTY	TEST	CONDITION	ENGLISH UNITS	SI UNITS
GENERAL				
• Specific Gravity	ASTM D792	73°F/23°C	1.55 g/cm^3	1.55 g/cm^3
• Specific Volume		73°F/23°C	0.645 cm^3/g	0.645 cm^3/g
• Water Absorption	ASTM D570	73°F/23°C	+0.03%	+0.03%
		212°F/100°C	+0.55%	+0.55%
• Rockwell Hardness	ASTM D785	73°F/23°C	119	
• Cell Class	ASTM D1784		23447-B	
MECHANICAL				
• Izod Impact	ASTM D256	73°F/23°C	1.5 ft lbs/in o.n	80 J/m o.n.
• Tensile Strength	ASTM D638	73°F/23°C	8000 psi	55 N/mm^2
• Tensile Modulus	ASTM D638	73°F/23°C	360,000 psi	2500 N/mm^2
• Flexural Strength	ASTM D790	73°F/23°C	15,100 psi	104 N/mm^2
• Flexural Modulus	ASTM D790	73°F/23°C	415,000 psi	2860 N/mm^2
• Compressive Strength	ASTM D695	73°F/23°C	10,100 psi	70 N/mm^2
• Compressive Modulus	ASTM D695	73°F/23°C	196,000 psi	1350 N/mm^2
THERMAL				
• Coefficient of Thermal Expansion	ASTM D696		3.4x10^{-5} in/in/°F	6.3x10^{-5}m/m/°K
• Thermal Conductivity	ASTM C177		0.95 BTU in/hr/ft/°F	0.14 Wm/°K/m^2
• Heat Distortion Temperature	ASTM D638		217°F	103°C
• Heat Capacity	DSC	73°F/23°C	0.21 BTU/lb°F	0.90 J/g°K
		212°F/100°C	0.26 BTU/lb°F	1.10 J/g°K
FLAMMABILITY				
• Flammability Rating	UL 94	0.062 in/ 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	60 Hz, 30°F/-1°C	1250 V/mil	492,000V/cm
• Dielectric Constant	ASTM D150	1000 Hz	3.70	3.70
• Power Factor	ASTM D150	73°F/23°C	0.007%	0.007%
• Volume Resistivity	ASTM D257		3.4x10^{15}ohm/cm	3.4x10^{15}ohm/cm

FEATURES AND BENEFITS

Corrosion resistance: NPOLY CPVC Pipe gives excellent resistance even under the harshest of water conditions so there are none of the purity worries from corrosion of metal pipe or soldered joints. NPOLY CPVC Pipe keeps pure water pure.

Lower bacterial growth: Bacteria build-up with CPVC is far lower than with alternative piping materials - Copper, Steel and other thermoplastics.

Tough, rigid material: NPOLY CPVC pipe has a much higher strength than other thermoplastics used in plumbing. This means that CPVC needs less hangers and supports and there is no unsightly looping of the pipe. NPOLY CPVC pipe has a higher pressure bearing capability. This leads to the same flow rate with smaller pipe size.

No scale, pit or leach formation: Even after years of use in the most aggressive conditions, NPOLY CPVC pipe won't corrode, standing up to low pH water, coastal salt air exposures and corrosive soils. NPOLY CPVC Pipe stays as solid and reliable as the day it was installed. It maintains full water carrying capacity because its scale resistance means no build -up to cause water pressure loss.

Unaffected by chlorine in the water: Some materials may be adversely affected by chlorine contained in the water supply, which can cause a breakdown of the polymer chains and potential leaks. In this respect, NPOLY CPVC pipe is unaffected by the chlorine present in the potable water supply.

Chemical resistance: CPVC has excellent chemical resistance to strong mineral acids and bases.

Low thermal expansion : NPOLY CPVC pipe has a lower coefficient of thermal expansion than alternative plastics, reducing the amount that the pipe expands when hot water is running, again reducing unsightly 'looping' of the pipe.

Easy, cold welding process: CPVC uses a simple, solvent cement jointing method. Tools required are very simple and inexpensive (chamfering tool and pipe cutter only) and avoid the need for an electrical source.

Superior insulation: NPOLY CPVC pipe is more energy-efficient than metal pipe. As an insulator, it does not lose heat the way metal pipes do. Heat loss and thermal expansion are reduced.

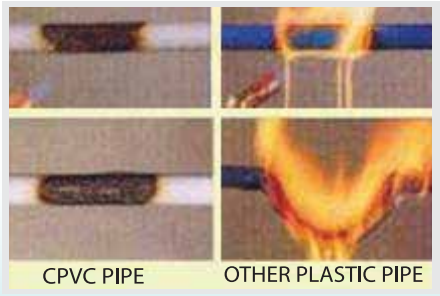
Hot and Cold water compatible: NPOLY CPVC pipe is compatible with both hot and cold water. It withstands very high temperatures compared to any other thermoplastic plumbing system. Many solar and electric water heaters have CPVC piping systems for heat efficiency and lower installation cost.

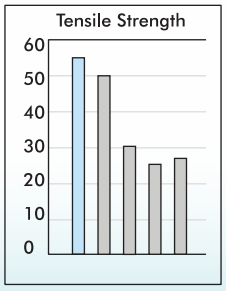
Fire safety: CPVC has a limiting Oxygen Index (LOI) of 60. Thus in air, NPOLY CPVC pipe do not support combustion. No flaming drips does not increase the fire load, low flame spread, low smoke generation.

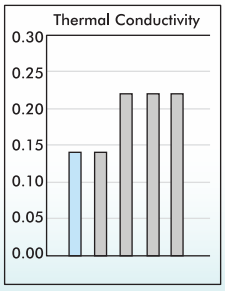
Approved worldwide: CPVC plumbing system is approved for contact with potable water in a wide range of countries including USA, UK, Canada, Germany, France, The Netherlands and Middle East among others.

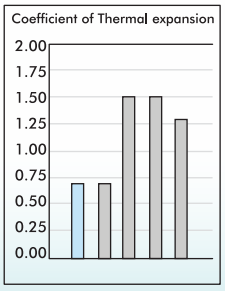
Over 48 years of trouble-free performance: Till date, CPVC plumbing system is working satisfactorily installed in 1959 in USA. NPOLY CPVC pipe is built on over 12 years of trouble-free performance. Based on the advanced polymer chemistry of Lubrizol, CPVC Plumbing Systems have a proven track record in millions of homes, apartments, hotels and offices.

Cost-effective: CPVC plumbing system is very cost -effective than any other plumbing system. It saves cost on fittings, loops, anchors, offsets, insulation, labour and expensive tools. More over NPOLY CPVC plumbing systems last longer more than 50 years.

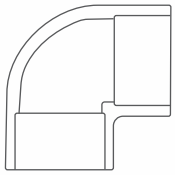






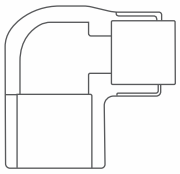


COPPER- TUBE SIZE AS PER ASTM D-2846



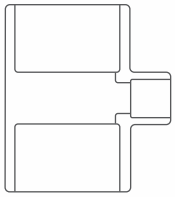
Size (mm)	Size (In.)
20	0.75
25	1.0
32	1.25
40	1.5
50	2.0

ELBOW 90°



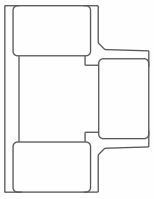
Size (mm)	Size (In.)
25 x 20	1 x 0.75
32 x 20	1.25 x 0.75
32 x 25	1.25 x 1.0
40 x 20	1.5 x 0.75
40 x 25	1.5 x 1.0
50 x 25	2.0 x 1.0
50 x 40	2.0 x 1.5

REDUCING ELBOW



Size (mm)	Size (In.)
25 x 20	1 x 0.75
32 x 20	1.25 x 0.75
32 x 25	1.25 x 1.0
40 x 20	1.5 x 0.75
40 x 25	1.5 x 1.0
40 x 30	1.5 x 1.25
50 x 20	2.0 x 0.75
50 x 25	2.0 x 1.0
50 x 30	2.0 x 1.25
50 x 30	2.0 x 1.5

REDUCING TEE



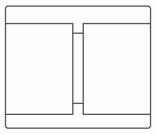
Size (mm)	Size (In.)
20	0.75
25	1.0
32	1.25
40	1.5
50	2.0

PLAIN TEE

* The above reducer fittings are professionally assembled using NPOLY fittings and bushings. Quantity as per order.
NOTE : Fabricated reducer fittings are not eligible for return to the manufacturer.

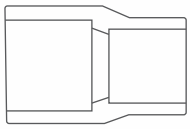
CPVC PIPE & FITTINGS FOR HOT & COLD WATER DISTRIBUTION SYSTEMS

COPPER- TUBE SIZE AS PER ASTM D-2846

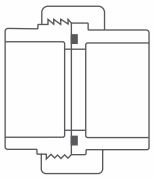
Size (mm)	Size (In.)
20	0.75
25	1.0
32	1.25
40	1.5
50	2

PLAIN SOCKET

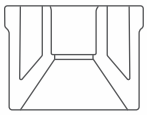
Size (mm)	Size (In.)
25 x 20	1.0 x 0.75
32 x 20	1.25 x 0.75
32 x 20	1.25 x 1.0
40 x 20	1.5 x 0.75
40 x 25	1.5 x 1.0
40 x 32	1.5 x 1.25
50 x 20	2.0 x 0.75
50 x 25	2.0 x 1.0
50 x 32	2.0 x 1.25
50 x 40	2.0 x 1.5

REDUCING SOCKET

Size (mm)	Size (In.)
20	0.75
25	1.0
32	1.25
40	1.5
50	2.0

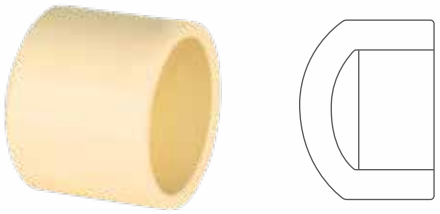
UNION

Size (mm)	Size (In.)
25 x 20	1 x 0.75
32 x 20	1.25 x 0.75
32 x 25	1.25 x 1.0
40 x 20	1.5 x 0.75
40 x 25	1.5 x 1.0
40 x 32	1.5 x 1.25
50 x 20	2.0 x .75
50 x 25	2.0 x 1.0
50 x 32	2.0 x 1.25
50 x 40	2.0 x 1.5

REDUCING BUSH

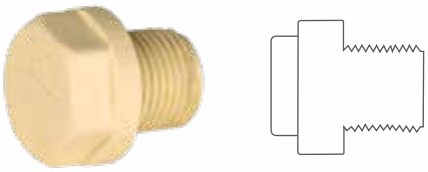
COPPER- TUBE SIZE AS PER ASTM D-2846



Size (mm)	Size (In.)
20	0.75
25	1.0
32	1.25
40	1.5
50	2.0

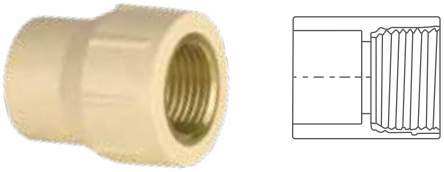
Only those products bearing the NSF Mark are certified

END CAP



Size (mm)	Size (In.)
15	0.5
20	0.75

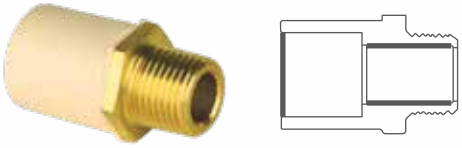
END PLUG THREADED



Size (mm)	Size (In.)
20 x 15	0.75 x 0.5

Only those products bearing the NSF Mark are certified

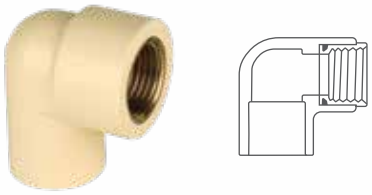
FEMALE SOCKET BRASS THREAD



Size (mm)	Size (In.)
20 x 15	0.75 x 0.5

Only those products bearing the NSF Mark are certified

MALE SOCKET BRASS THREAD

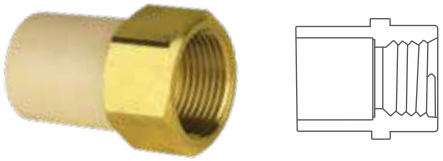


Size (mm)	Size (In.)
20 x 15	0.75 x 0.5

Only those products bearing the NSF Mark are certified

FEMALE ELBOW BRASS THREAD

COPPER- TUBE SIZE AS PER ASTM D-2846

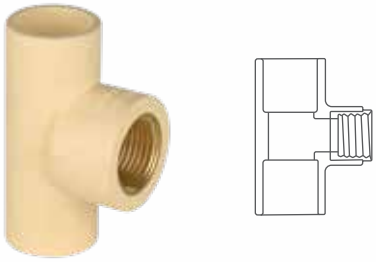


Size (mm)	Size (In.)
20	0.75
25	1.0
32	1.25
40	1.5
50	2.0

FEMALE ADAPTER (Brass Threads)

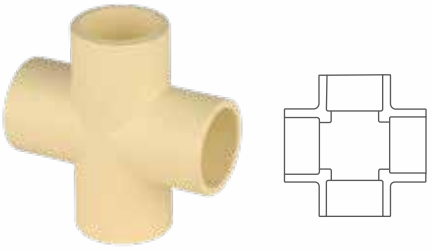
Size (mm)	Size (In.)
20	0.75
25	1.0
32	1.25
40	1.5
50	2.0

MALE ADAPTER (Brass Threads)



Size (mm)	Size (In.)
20 x 20 x 15	.75 x .75 x .5
25 x 25 x 15	1 x 1 x .5

BRASS TEE PART FPT



Size (mm)	Size (In.)
20	0.75
25	1.0

CROSS TEE

CPVC PIPE & FITTINGS FOR HOT & COLD WATER DISTRIBUTION SYSTEMS

NPOLY PIPE & FITTINGS

COPPER- TUBE SIZE

Size (mm)	Size (In.)	Standard Pkg. 3 Mtr. Lengths
15	0.5	100
20	0.75	50
25	1.0	30
32	1.25	20
40	1.5	15
50	2.0	8

PIPE SDR-11

Size (mm)	Size (In.)	Standard Pkg. 3 Mtr. Lengths
15	0.5	100
20	0.75	50
25	1.0	30
32	1.25	20
40	1.5	15
50	2.0	8

Class 2 - PIPE SDR -13.5

IPS - IRON PIPE SIZE AS PER ASTM F-441

Size (mm)	Size (In.)	Standard Pkg 3 Mtr.Lengths
65	2.5	5
80	3	3
100	4	2
150	6	1

PIPE SCHEDULE 40

Size (mm)	Size (In.)	Standard Pkg 3 Mtr.Lengths
65	2.5	5
80	3	3
100	4	2
150	6	1

PIPE SCHEDULE 80

Only those products bearing the NSF Mark are certified

NPOLY CPVC CEMENT

CPVC 724

Size
473 ml
946 ml

N.B. For sizes 65 mm(2½") and above

Size
44 ml - Tube
50 ml
118 ml
237 ml
473 ml
946 ml

Reduced VOC Emissions, NSF Listed ASTM F-493
N.B. For sizes 15 mm (½") to 50 mm (2")

NPOLY 1-STEP ADHESIVE SOLUTION (YELLOW)

TECHNICAL DETAILS

Outside Diameters and Wall Thicknesses For CPVC 4120, SDR 11 Plastic Pipe As Per ASTM D-2846

Nominal Size (in.)	(mm)	Outside Diameter, in. (mm) Average	Tolerance	Wall Thickness, in. (mm) Minimum	Tolerance	Pressure Rating.PSI (Kg/Cm²) 73.4°F	(23°C)	180°F	(82°C)
½*	(15)	0.625 (15.9)	± 0.003 (0.08)	0.068 (1.73)	+ 0.020 (0.51)	400	(28.1)	100	(7.0)
¾	(20)	0.875 (22.2)	± 0.003 (0.08)	0.080 (2.03)	+ 0.020 (0.51)	400	(28.1)	100	(7.0)
1	(25)	1.125 (28.6)	± 0.003 (0.08)	0.102 (2.59)	+ 0.020 (0.51)	400	(28.1)	100	(7.0)
1¼	(32)	1.375 (34.9)	± 0.003 (0.08)	0.125 (3.18)	+ 0.020 (0.51)	400	(28.1)	100	(7.0)
1½	(40)	1.625 (41.3)	± 0.004 (0.10)	0.148 (3.76)	+ 0.020 (0.51)	400	(28.1)	100	(7.0)
2	(50)	2.125 (54.0)	± 0.004 (0.10)	0.193 (4.90)	+ 0.023 (0.58)	400	(28.1)	100	(7.0)

* For ½" wall thickness minimum is not a function of SDR.

Outside Diameters and Wall Thicknesses For CPVC 4120, SDR 13.5 Plastic Pipe

Nominal Size (in.)	(mm)	Outside Diameter, in. (mm) Average	Tolerance	Wall Thickness, in. (mm) Minimum	Tolerance	Pressure Rating.PSI (Kg/Cm²) 73.4°F	(23°C)	180°F	(82°C)
½*	(15)	0.625 (15.9)	± 0.003 (0.08)	0.055 (1.40)	+ 0.020 (0.51)	320	(22.5)	80	(5.6)
¾	(20)	0.875 (22.2)	± 0.003 (0.08)	0.065 (1.65)	+ 0.020 (0.51)	320	(22.5)	80	(5.6)
1	(25)	1.125 (28.6)	± 0.003 (0.08)	0.083 (2.12)	+ 0.020 (0.51)	320	(22.5)	80	(5.6)
1¼	(32)	1.375 (34.9)	± 0.003 (0.08)	0.102 (2.59)	+ 0.020 (0.51)	320	(22.5)	80	(5.6)
1½	(40)	1.625 (41.3)	± 0.004 (0.10)	0.120 (3.06)	+ 0.020 (0.51)	320	(22.5)	80	(5.6)
2	(50)	2.125 (54.0)	± 0.004 (0.10)	0.157 (4.00)	+ 0.023 (0.58)	320	(22.5)	80	(5.6)

* For ½" wall thickness minimum is not a function of SDR.

Outside Diameters and Wall Thicknesses For CPVC 4120, Schedule 40 Pipe As per ASTM F 441

Nominal Size (in.)	(mm)	Outside Diameter, in. (mm) Average	Tolerance	I.D. Average	Wall Thickness, in. (mm) Minimum	Tolerance	Pressure Rating.PSI(Kg/Cm²) 73.4°F	(23°C)
2½	(65)	2.875 (73.0)	± 0.007 (0.18)	2.444 (62.07)	0.203 (5.16)	+ 0.024 (0.61)	300	(21.10)
3	(80)	3.500 (88.9)	± 0.008 (0.20)	3.041 (77.26)	0.216 (5.49)	+ 0.026 (0.66)	280	(18.28)
4	(100)	4.500 (114.3)	± 0.009 (0.23)	3.998 (101.55)	0.237 (6.02)	+ 0.028 (0.71)	220	(15.47)
6	(150)	6.625 (168.3)	±0.011 (0.28)	6.032 (153.22)	0.280 (7.11)	+ 0.034 (0.86)	180	(12.66)
8	(200)(	8.625 (219.1)	±0.015 (0.38)	7.942 (201.72)	0.322 (8.18)	+ 0.039 (0.99)	160	(11.25)
10	250)	10.750 (273.1)	±0.015 (0.38)	9.976 (253.39)	0.365 (9.27)	+ 0.044 (1.12)	140	(9.84)
12	(300)	12.750 (323.9)	±0.015 (0.38)	11.889(301.98)	0.406 (10.31)	+ 0.049 (1.24)	130	(9.14)

Outside Diameters and Wall Thicknesses For CPVC 4120, Schedule 80 Pipe As per ASTM F 441

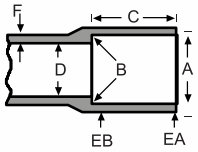
Nominal Size (in.)	(mm)	Outside Diameter, in. (mm) Average	Tolerance	I.D. Average	Wall Thickness, in. (mm) Minimum	Tolerance	Pressure Rating.PSI(Kg/Cm²) 73.4°F	(23°C)
2½	(65)	2.875 (73.0)	± 0.007 (0.18)	2.288 (58.14)	0.276 (7.01)	+ 0.033 (0.84)	420	(29.53)
3	(80)	3.500 (88.9)	± 0.008 (0.20)	2.864 (72.75)	0.300 (7.62)	+ 0.036 (0.91)	370	(26.01)
4	(100)	4.500 (114.3)	± 0.009 (0.23)	3.778 (95.97)	0.337 (8.56)	+ 0.040 (1.02)	320	(22.50)
6	(150)	6.625 (168.3)	±0.011 (0.28)	5.710 (145.04)	0.432 (10.97)	+ 0.052 (1.32)	280	(19.69)
8	(200)	8.625 (219.1)	±0.015 (0.38)	7.565 (192.15)	0.500 (12.70)	+ 0.060 (1.52)	250	(17.57)
10	(250)	10.750 (273.1)	±0.015 (0.38)	9.493 (241.12)	0.593 (15.06)	+ 0.071 (1.80)	230	(16.17)
12	(300)	12.750 (323.9)	±0.015 (0.38)	11.294(286.87)	0.687 (17.45)	+ 0.082 (2.08)	230	(16.17)

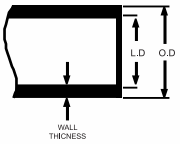
Temperature Derating Factors

Working Temperature(°F)	73-80	90	100	120	140	160	180	200
Working Temperature(°C)	23-25	32	38	49	60	71	82	93
Pipe Derating Factor	1.00	0.91	0.82	0.65	0.50	0.40	0.25	0.20
Valve Derating Factor	1.00	0.95	0.90	0.80	0.70	0.61	0.53	0.45

N.B. : For obtaining working pressure in system, multiply the maximum pressure with derating factor at the working temperature of system.

* Valves, Unions & Special Products have different elevates temperature ratings than pipe.

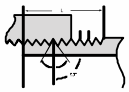


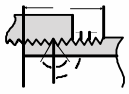


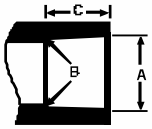
Tapered Socket Dimensions For CPVC 4120, SDR 11, Plastic Pipe Fittings AS PER ASTM D2846

Nominal Size (in.)	(mm)	Socket Entrance Diameter, in. (mm) "A" Average	"A" Tolerance	Socket Bottom Diameter, in. (mm) "B" Average	"B" Tolerance	Socket Length, in (mm) "C" min.	Inside Diameter, in (mm) "D" min.	Wall Thickness, in. (mm) Socket Enterance "EA" min.	Socket Bottom "EB" min.	"F"
½	(15)	0.633 (16.08)	±0.003 (0.08)	0.619 (15.72)	±0.003 (0.08)	0.500 (12.70)	0.489 (12.42)	0.068 (1.73)	0.102 (2.59)	0.128 (3.25)
¾	(20)	0.884 (22.45)	±0.003 (0.08)	0.870 (22.10)	±0.003 (0.08)	0.700 (17.78)	0.715 (18.16)	0.080 (2.03)	0.102 (2.59)	0.128 (3.25)
1	(25)	1.135 (28.83)	±0.003 (0.08)	1.121 (28.47)	±0.003 (0.08)	0.900 (22.86)	0.921 (23.39)	0.102 (2.59)	0.102 (2.59)	0.128 (3.25)
1¼	(32)	1.386 (35.20)	±0.003 (0.08)	1.372 (34.85)	±0.003 (0.08)	1.100 (27.94)	1.125 (28.58)	0.125 (3.18)	0.125 (3.18)	0.156 (3.96)
1½	(40)	1.640 (41.66)	±0.004 (0.10)	1.622 (41.20)	±0.004 (0.10)	1.300 (33.02)	1.329 (33.76)	0.148 (3.76)	0.148 (3.76)	0.185 (4.70)
2	(50)	2.141 (54.38)	±0.004 (0.10)	2.123 (53.92)	±0.004 (0.10)	1.700 (43.18)	1.739 (44.17)	0.193 (4.90)	0.193 (4.90)	0.241 (6.12)

BASIC SOCKET DIMENSIONS SCHEDULE 40 CPVC FITTINGS AS PER ASTM F 438 SCHEDULE 80 CPVC FITTINGS AS PER ASTM F 439







Nominal Size (in.)	(mm)	Diameter (in.) Entrance A	Bottom B	Tolerance	Socket Length Minimum C (in.) SCH 40	SCH 80
65	2½	2.889	2.868	±0.007	1.750	1.750
80	3	3.516	3.492	±0.008	1.875	1.875
100	4	4.518	4.491	±0.009	2.000	2.250
150	6	6.647	6.614	±0.011	3.000	3.000
200	8	8.655	8.610	±0.015	4.000	4.000
250	10	10.780	10.735	±0.015	5.000	5.000
300	12	12.780	12.735	±0.015	6.000	6.000

AMERICAN NATIONAL STANDARD TAPER PIPE THREADS (NPT) ANSI STANDARD B1.20.1 ASTM STANDARD F 1498

Nominal Size (mm)	(in.)	Threads Per in.	Effective Thread Length (L)	Pitch of Thread (P)
15	½	14	0.5337	0.07143
20	¾	14	0.5457	0.07143
25	1	11½	0.6828	0.08696
32	1¼	11½	0.7068	0.08696
40	1½	11½	0.7235	0.08696
50	2	11½	0.7565	0.08696
65	2½	8	1.1375	0.12500
80	3	8	1.2000	0.12500
100	4	8	1.3000	0.12500

BSP ISO 7/1 PARALLEL THREADS

Nominal Size (mm)	(in.)	Threads Per in.	Effective Thread Length (L)	Pitch of Thread (P)
15	½	14	13.152	1.8143
20	¾	14	14.514	1.8143
25	1	11	16.714	2.3091
32	1¼	11	19.050	2.3091
40	1½	11	19.050	2.3091
50	2	11	23.378	2.3091
65	2½	11	26.698	2.3091
80	3	11	29.873	2.3091
100	4	11	35.791	2.3091

THERMAL EXPANSION AND CONTRACTION

Like all piping material, Flowguard CPVC expands when heated and contracts when cooled. CPVC piping (regardless of pipe diameter) will expand about 1 inch per 50 feet of length when subjected to a 50° F temperature increase, therefore, allowances must be made for this resulting movement. However, laboratory testing and installation experience have demonstrated that the practical issues are much smaller than the coefficient of thermal expansion would suggest.

The stresses developed in CPVC pipe are generally much smaller than those developed in a metal pipe for equal temperature changes because of the difference in elastic modulus. Required loops are smaller than those recommended by the Copper Development Association for copper systems. Expansion is mainly a concern in hot water lines, Generally thermal expansion can be accommodated with changes in direction.

However, a long straight run may require an offset or loop. Only one expansion loop, properly sized is required in any single straight run, regardless of its total length. If more convenient, two or smaller expansion loops, properly sized, can be utilized in a single run of pipe to accommodate the thermal movement. Be sure to hang pipe with smooth straps that will not restrict movement. For convenience, loop (or offset) lengths have been calculated for different pipe sizes and different run lengths with a temperature increase (DT) of about 80°F.

The results, shown in Tables A and B, are presented simply as a handy guide for quick and easy determinations of acceptable loop length for the approximate conditions. Loop length for other temperatures and run length can be calculated utilizing the following equations:

Expansion Loop Formula

$$L = \sqrt{\frac{3ED(\Delta L)}{2S}}$$

Where: L = Loop length (in.)

E = Modulus of elasticity at maximum temperature (psi)

S = Working Stress at maximum temperature (psi)

D = Outside diameter of pipe (in.)

ΔL = Change in length due to change in temperature (in.)

(see formula below)

Thermal Expansion Formula

$$\Delta L = Lp\ C\Delta T$$

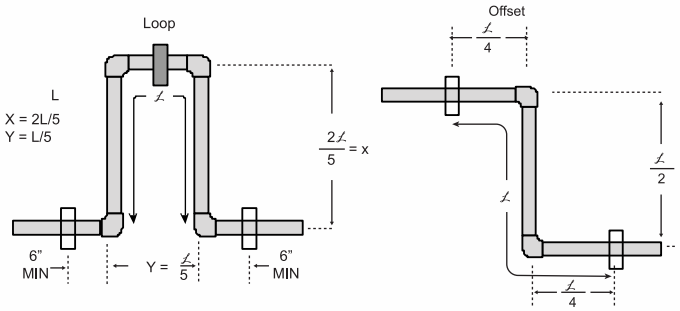
Where: ΔL = Change in length due to change in temperature (in.)

Lp = Length of pipe (in.)

C = Coefficient of thermal expansion (in. / in. /°F)

= 3.4 x 10 in. / in./°F for CPVC-5

ΔT = Change in temperature (°F)



Modulus of Elasticity and Working Stress for CPVC

Temperature °F	(°C)	Modulus,E(psi)	Stress, S(psi)
73	(27)	423,000	2000
90	(32)	403,000	1800
110	(43)	371,000	1500
120	(49)	355,000	1300
140	(60)	323,000	1000
160	(71)	291,000	750
180	(82)	269,000	500

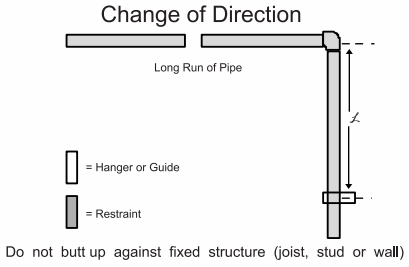


TABLE A
Flowguard CPVC pipe CTS PIPES (ASTM D 2846)
Calculated Loop (Offset) Length with
ΔT of approx. 80°F
Length of Run in feet

Nominal Pipe size mm	in.	40	60	80	100
		Loop Length(L) in inches			
15	½	22	27	31	34
20	¾	26	32	36	41
25	1	29	36	41	46
32	1¼	32	40	46	51
40	1½	35	43	50	56
50	2	40	49	57	64

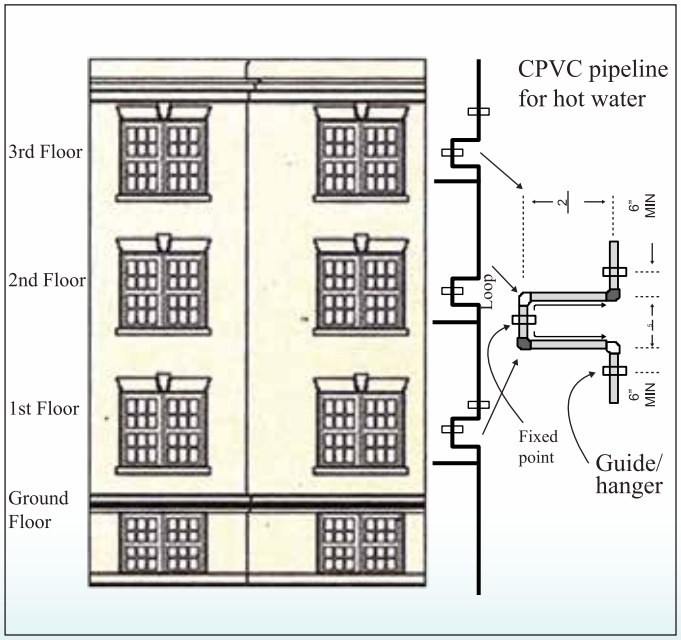
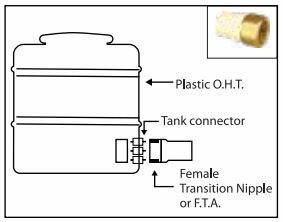


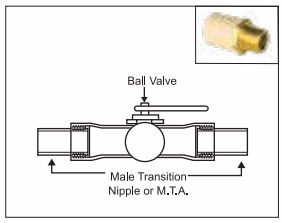
TABLE B
Flowguard CPVC IPS PIPES (ASTM F 441)
Calculated Loop (Offset) Length with
ΔT of approx. 80°F
Length of Run in feet

Nominal Pipe size mm	in.	40	60	80	100
		Loop Length(L) in inches			
65	2½	47	57	66	74
75	3	52	63	73	82
100	4	58	72	83	92
150	6	71	87	100	112
200	8	81	99	114	128
250	10	90	111	128	143
300	12	98	121	139	156

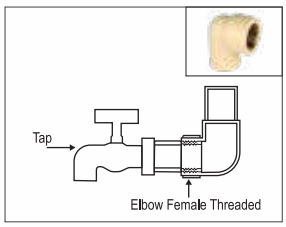
Horizontal & Vertical runs of NPOLY FlowGuard Pipe should be supported by pipe clamps or by hangers located on the horizontal connection close to the riser hangers should not have rough or sharp edges, which come in contact with the pipe.

HORIZONTAL AND VERTICAL SUPPORT SPACING									
Nominal Pipe Size		21°C (70°F)		49°C (120°F)		71°C (160°F)		82°C (180°F)	
mm	in	Ft.	(cm)	Ft.	(cm)	Ft.	(cm)	Ft.	(cm)
15	½	5.5	(167.70)	4.5	(137.16)	3.0	(91.44)	2.5	(76.20)
20	¾	5.5	(167.70)	5.0	(152.40)	3.0	(91.44)	2.5	(76.20)
25	1	6.0	(182.88)	5.5	(167.70)	3.5	(106.68)	3.5	(91.44)
32	1¼	6.5	(198.12)	6.0	(182.88)	3.5	(106.68)	3.5	(106.68)
40	1½	7.0	(213.36)	6.0	(182.88)	3.5	(106.68)	3.5	(106.68)
50	2	7.0	(213.36)	6.5	(198.12)	4.0	(121.92)	3.5	(106.68)
65	2½	8.0	(244.00)	7.5	(228.60)	4.5	(137.16)	4.0	(121.92)
75	3	8.0	(244.00)	7.5	(228.60)	4.5	(137.16)	4.0	(121.92)
100	4	9.0	(274.32)	8.5	(259.08)	5.0	(152.40)	4.5	(137.16)
150	6	10.0	(304.80)	9.0	(274.32)	5.5	(167.07)	5.0	(152.40)
200	8	11.0	(335.28)	10.0	(304.80)	6.0	(182.88)	5.5	(167.07)
250	10	11.5	(350.52)	10.5	(320.04)	6.5	(198.12)	6.0	(182.88)
300	12	12.5	(381.00)	11.0	(335.28)	7.5	(228.60)	6.5	(198.12)





TRANSITION FITTINGS & JOINTS



Special transition fittings or joints are used whenever CPVC piping is connected to a metal valve, fittings or other appurtenance such as a filter, or to parts made of another plastic. These special transition fittings can have many forms. One common form is the true union with a metal end and a CPVC end held together with a plastic or metal gland nut and having an elastomeric seal between them.

Other forms are the flanged joint, the grooved joint, insert molded metal in CPVC fittings, patented push-on type fittings and finally the CPVC female threaded adapter with an elastomeric seal at the bottom of the thread. The later fittings are designed so that they have no thread interference and rely entirely on the elastomeric seal for water tightness. They require only minimal torque to attain an adequate seal.

Standard compression fittings which utilize brass of plastic ferrules can be used to assemble CPVC. However, Teflon® tape should be applied over the brass ferrule to compensate for the dissimilar thermal expansion rates of the brass and CPVC that could possibly otherwise result in a leak. Care should be taken not to over-torque the compression connection.

Metal fittings with CPVC socket inserts are also available. The tubing is cemented directly into the socket in the same way as an all-CPVC fitting. The standard practice is to thread a male thread adapter into the female threaded part, such as a valve of stop, and then solvent cement to the CPVC pipe. However, when using the male thread adapter, there are two limitations that the installer must consider when deciding where and how to use it. First, the male thread adapter may develop a drip leak if the joint is subjected to a too broad temperature range.

And second, some thread sealants intended to minimize leak problems may chemically attack the CPVC and cause stress cracking of the adapter (see Thread Sealants section). The preferred method of transitioning between metal and CPVC plumbing components is to use an insert molded metal-in-CPVC fitting or true union with a metal and a CPVC end.

CPVC pipes and fittings can be installed underground. Since these piping systems are flexible systems. Proper attention should be given to burial conditions. The stiffness of the piping system is affected by sidewall support, soil compaction, and the condition of the trench. Trench bottoms should be smooth and regular in either undisturbed soil or a layer of compacted backfill. The pipe must lie evenly on this surface throughout the entire length of its barrel. Excavation, bedding and backbit should be in accordance with the provision of the local Plumbing Code having jurisdiction.

TRENCHING

The following trenching and burial procedures should be used to protect the piping system.

1. The trench should be excavated to ensure the sides will be stable under all working conditions.

2. The trench should be wide enough to provide adequate room for the following :

A. Joining the pipe in the trench.

B. Snaking the pipe from side or side to compensate for expansion and contraction.

C. Filling and compacting the side fills.

The space between the pipe and trench wall must be wider than the compaction equipment used in the compaction of the backfill. Minimum width shall not be less than the greater of either the pipe outside diameter plus 16 inches of the pipe outside diameter times 1.25 plus 12 inches. Trench width may be different if approved by the design engineer.

3. The trench bottom should be smooth, free of rocks and debris. Continuous, and provide uniform support. If ledge rock, hardpan or largo boulders are encountered, the trench bottom should be padded with bedding of compacted granular material to a thickness of at least 0 inches. Foundation bedding should be installed as required by the engineer.

4. Trench depth is determined by the pipe's service requirements. Plastic pipe should always be installed at least below the frost level. The minimum cover for lines subject to heavy overhead traffic is 24 inches.

5. A smooth trench bottom is necessary to support the pipe over its entire length on firm stable material. Blocking should not be used to change pipe grade or to intermittently support pipe over low sections in the trench.

BEDDING AND BACKFILLING

Even though sub-soil conditions vary widely from place to place, the pipe backbit should be stable and provide protection for the pipe.

The pipe should be surrounded with a granular material which is easily worked around the sides of the pipe Backfilling should be performed in layer of 6 inches with each layer being sufficiently compacted to 85% to 95% compaction.

A mechanical tamper Is recommended for compacting sand and gravel backfill which contain a significant proportion of fine-grained material, such as silt and clay. II a tamper is not available. compacting should be done by hand.

The trench should be filled. The backfill should be placed and spread in fairly uniform layers to prevent any unfilled spaces or voids. Large rocks, stones, frozen clods, or other large debris should be removed. Heavy tampers or rolling equipment should only be used to consolidate only the final bacMill.

HANDLING :

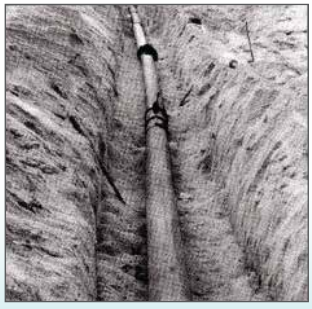
The pipe should be handled with reasonable care. Because the thermoplastic pipe is much lighter in weight than the metal pipe, there is sometimes a tendency to throw it around. This should be avoided. The pipe should never be dragged or pushed from a truck bed. Pallets for pipe should be removed with a forklift.

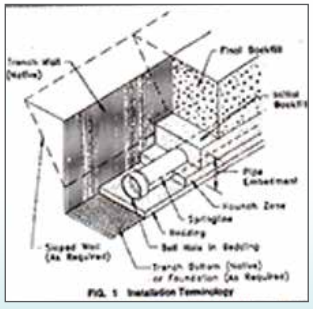
A loose pipe can be rolled down timbers as long as the pieces do not fall on each other or on any hard or uneven surface. In all cases, severe contact with any sharp objects (rocks, angle irons, forks on forklifts, etc.) should be avoided.

STORING :

If possible, pipe should be stored inside. When this is not possible, the pipe should be stored on level ground which is dry and free from sharp objects. If different schedules of pipes are stacked together, the pipes with the thickest walls should be at the bottom. The pipes should be protected from the sun and be in an area with proper ventilation. This will lessen the effects of ultraviolet rays and help prevent heat build-up.

If the pipes are stored in racks, it should be continuously supported along its length. If this is not possible, the spacing of the supports should not exceed three feet (3'). When storage temperatures are below 0°C (32°F), extra care should be taken when handling the pipe. This will help prevent any problems which could be caused by the slightly lower impact strength of PVC pipes at a temperature below freezing.





JOINING NPOLY FLOWGUARD PIPES & FITTINGS

01. CUTTING

To make a proper and neat joint, measure the pipe length accurately and make a small mark. Ensure that the pipe and fittings are size compatible. You can easily cut with a wheel type plastic pipe cutter or hacksaw blade. Cutting tubing as squarely as possible provides optimal bonding area within a joint.

02. DEBURRING/ BEVELING

Burrs and fillings can prevent proper contact between tube and fitting during assembly and should be removed from the outside and inside of the pipe. Debarking tool, pocket knife or file are suitable for this. A slight bevel on the end of the tubing will ease the entry of the tubing into the fitting socket.

03. FITTING PREPARATION

Using a clean, dry rag, wipe dirt and moisture from the fitting sockets and tubing end. The tubing should make contact with the socket wall 1/3 to 2/3 of the way into the fitting socket.

04. SOLVENT CEMENT APPLICATION

Use only CPVC cement or an all-purpose cement conforming to ASTM F 493 or joint failure may result. When making a joint, apply a heavy, even coat of cement to the pipe end. Use the same applicator without additional cement to apply a thin coat inside the fitting socket. Too much cement can cause clogged waterways.

05. ASSEMBLY

Immediately insert the tubing into the fitting socket, rotate the tube ¼ to ½ turn while inserting. This motion ensures an even distribution of cement within the joint. Properly align the fittings. Hold the assembly for approximately 10 seconds, allowing the joint to be set up.

06. SET AND CURE TIMES

Solvent cement set and cure times are a function of pipe size, times are a function of pipe size, temperature and relative humidity. Curing time is shorter for drier environments, smaller sizes and higher temperatures. It requires 10 to 20 minutes for a perfect joint.

Note : For sizes above 65 mm (2½") use IPS 70 primer before applying solvent cement. The purpose of a primer is to penetrate and soften the surfaces so they can stick together. The proper use of a primer ensures that the surfaces are prepared for fusion in a wide variety of weather conditions.

SOLVENT CEMENT, PRIMER AND CLEANER HOW TO USE

BEFORE BEGINNING :

1. Verify the cement is the same as the pipes and fittings being used.
2. Check the temperature where the cementing will take place.

• Cement takes a longer time to set up in cold weather. Be sure to allow extra time for curing. Do not try to speed up the cure by artificial means - this could cause porosity and blisters in the cement film.

• Solvents evaporate faster in warm weather. Work quickly to avoid the cement setting up before the joint is assembled. Keep the cement as cool as possible. Try to stay out of direct sunlight.

3. Keep the lid on cement, cleaner, and primers when not used. Evaporation of the solvent will affect the cement.
4. Stir or shake cement before using.
5. Use 20 mm (¾") dauber on small diameter pipes, 40 mm (1½") dauber up through 80 mm (3") pipe, and a natural bristle brush,
swab, or roller ½ the pipe diameter on pipes 4" and up.
6. Do not mix cleaner or primer with cement.
7. Do not use thickened or lumpy cement. It should be like the consistency of syrup or honey.
8. Do not handle joints immediately after assembly.
9. Do not allow daubers to dry out.
10. Maximum temperature allowable for CPVC pipe is 180°F.
11. All colored cement, primers, and cleaners will have a permanent stain. There is no known cleaning agent.
12. Use according to the step outline in ASTM D-2846, joining of pipe and fittings

Number of joints per liter of cement by pipe size

Dia of Pipe (mm)	(In.)	Appx. Nos of joints*
15	½	1200
20	¾	750
25	1	500
32	1¼	450
40	1½	325
50	2	225
65	2½	50
75	3	40
100	4	30
150	6	10
200	8	5
250	10	2-4
300	12	1-2

* Appx. Nos of joints which can be made per ltr. of Solvent Cement

SAFE HANDLING OF SOLVENT CEMENT

When using solvent cement, primers and cleaners there are some basic safety measures. All users should keep in mind.

• Avoid prolonged breathing of solvent vapors. When pipe and fittings are being joined in enclosed areas, the use of ventilation devices are advised. Keep cement, primers and cleaners away from all sources of ignition, heat, sparks and open flame.

• Keep containers of cement, primers and cleaners tightly closed except when the product is being used.

• Dispose of all rags used with solvents in a proper outdoor waste receptacle.

• Avoid eye and skin contact. In case of eye contact, flush with plenty of water for 15 minutes and call a physician.

Thread Sealants

Threaded CPVC fittings with tapered pipe threads (e.g. male thread adapters) must be used with a suitable thread sealant to ensure leak-proof joints. Over the years, PTFE (Teflon® or equivalent) tape has been the preferred thread sealant, it is still the most widely accepted and approved sealant. Some paste sealants can affect CPVC fittings; therefore only sealants recommended for use with CPVC by the thread sealant manufacturer should be used.

Water Heater Connections

Some plumbing codes contain detailed requirements for connections to gas or electric storage type water heaters. Determine whether your code has such requirements and satisfy them.

If no detailed requirements exist, use the following information. On electric water heaters, CPVC can be piped directly to the heater with special metal- to- CPVC transition fittings (photo L). On gas water heaters there should be at least 6 inches of clearance between the exhaust flue and any CPVC piping (photo K). Twelve inch long metal nipples or appliance connectors should be connected directly to the heater so that the CPVC tubing cannot be damaged by the build-up of excessive radiant heat from the flue.

An approved temperature/pressure (T/P) relief valve should be installed so that the probe or sensing element is in the water at the top of the heater. CPVC is approved by all the model codes for use as relief valve drain line piping. Use a metal-to- CPVC transition fitting to connect to the relief valve and continue the pipe full size to the outlet. For horizontal runs, slope the pipe toward the outlet and support it at three-feet centers or closer. The pipe must discharge to the atmosphere at an approved location.

Do not use CPVC pipe and fittings with commercial-type, non-storage water heaters.

(L) Gas water heater connection

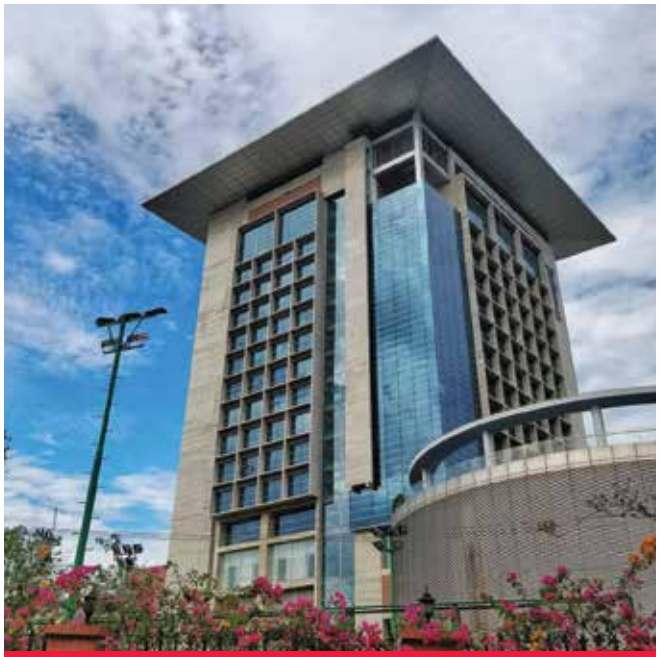
(K) CPVC electric water heater connection

CPVC PIPE

PROJECTS

Square Hospitals Ltd.

Sheikh Hasina National Institute of Burn and Plastic Surgery



Radisson Blu Chattogram

Sayeman Beach Resort

OUR CLIENTS

	Apex Fashion Wear Limited	SQUARE
CHARUTA	find your future, today METRO HOMES	BADSHA TEXTILES LTD.
CDA	C2C Pharma	
Radisson BLU	Lakeshore Hotels	

OUR CLIENTS

Kunjo Developers	THE CIVIL ENGINEERS LTD.	LK Lotus Kamal Properties Ltd.
SM GROUP	Rani Food Industries Ltd.	VILLAGE EDUCATION RESOURCE CENTER VERC
Khuruskul Ashrayan Prokolpo	National Institute of ENT	BASHUNDHARA GROUP For the People, for the Country
Saiham Knit Composite	MG MOHAMMADI GROUP	

GENERAL GUIDELINES FOR ALL INSTALLATIONS

DO's

1. Install product according to NPOLY Installation instructions and manual and follow recommended safe work practices.

2. Keep Pipes and Fittings in original packaging until needed and store pipes in covered areas.

3. Use tools designed for use with plastic pipes and fittings.

4. Cut-off minimum 25 mm beyond the edge of the crack in case any crack is discovered on the pipe.

4a. Pipe may be cut quickly and efficiently by several methods.Wheel-type plastic tubing cutters are preferred. Ratchet-type cutters or fine-tooth saws are another options. However, when using the ratchet cutter, be certain to score the exterior wall by rotating the cutter blade in a circular motion around the pipe. Do this before applying significant downward pressure to finalize the cut. This step leads to a square cut. In addition, make sure ratchet cutter blades are sharp. Cutting tubing as squarely as possible provides optimal bonding area within a joint.

4b. Burrs and filings can prevent proper contact between the tube and fittings during assembly, and should be removed from the outside and inside of the tube. A chamfering tool is preferred, but a pocket knife or file is also suitable for this purpose.

4c. Use only CPVC Cement or an all-purpose cement conforming to ASTM F-493 or joint failure may result.

5. Always conduct hydraulic pressure testing after installation to detect any leaks and faults. Wait for appropriate cure time before pressure testing. Fill lines slowly and bleed air from the system prior to pressure testing.

6. Rotate the pipe 90° to 180° to spread the CPVC Solvent Cement evenly in the joint while pushing the Pipe into Fitting.

7. Use Teflon tapes with threaded fittings.

8. Ensure that there are no sharp edges in contact with the pipe while embedding the pipes on the walls or in the floors.

8a. When making a transition connection to metal threads, use a special transition fitting or CPVC male threaded adapter whenever possible. Do not over-torque plastic threaded connections. Head tight plus one-half turn should be adequate.

9. Provide Vertical & Horizontal Supports as recommended using the Plastic Straps only.

10. Apply a water-based paint only on exposed pipes & fittings

11. Visually inspect all joints for proper cementing at the end of shift or day. A visual inspection of the complete system is also recommended during pressure testing.

12. When connecting to a gas water heater, CPVC tubing should not be located within 50 cm of the flue. For water heaters lacking reliable temperature control, this distance may be increased up to 1m. A metal nipple or flexible appliance connector should be utilized. This measure eliminates the potential for damage to plastic piping that might result from excessive radiant heat from the flue.

13. The use of a brass/CPVC transition adapter when connecting CPVC to a water heater will help facilitate water heater replacement in the future.

14. Pressure test CPVC systems in accordance with local code requirements.

Dont's

1. Do not use Metal Hooks or Nails to support/hold or put pressure on the pipes. Do not use straps & hangers with rough or sharp edges. Do not tighten the straps over the pipes.

2. Never expose the pipe to Open Flame while trying to bend it.

3. Do not drop pipes on edges from heights. Do not drop heavy objects on pipes or walk on pipes.

4. Do not dilute Solvent Cement with Thinners /MTO or any other liquid etc.

5. Do not use air or gases for pressure testing.

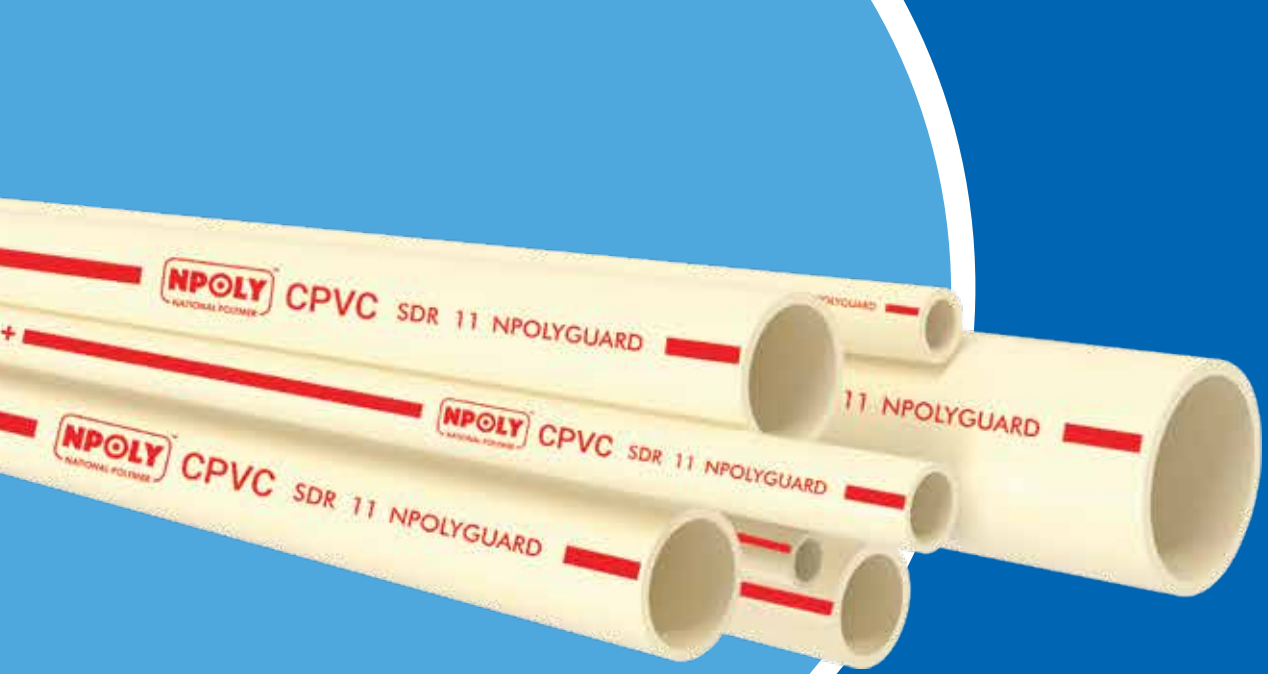
6. Do not use any other petroleum or solvent- based sealant, adhesive, lubricant or fire stop material on CPVC pipes and fittings.

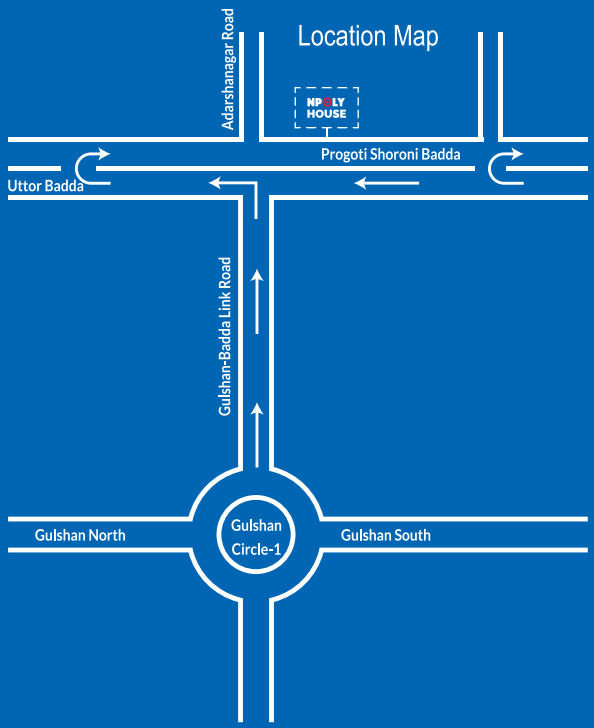
7. Do not use CPVC Pipes & Fittings for pneumatic applications.

CPVC PLUMBING SYSTEM

RIGHT CHOICE FOR
HOT & COLD
WATER PLUMBING SYSTEM

HOT & COLD





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