ASTRAL PIPES

CPVC PRO®

ADVANCED HOT AND COLD WATER PLUMBING SOLUTIONS

PRODUCT CATALOGUE

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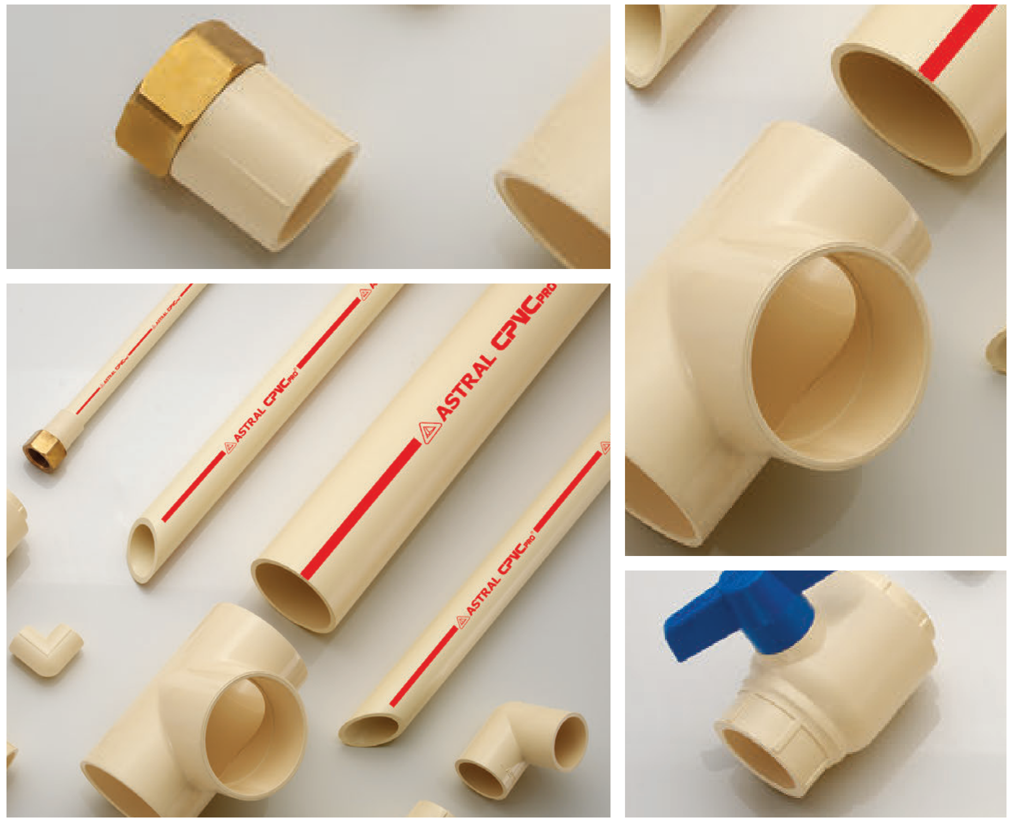

1st TO INTRODUCE CPVC IN INDIA

1st TO INTRODUCE UPVC LEAD FREE PIPES IN INDIA

1st TO INTRODUCE LOW NOISE PP DRAINAGE PIPES IN INDIA

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1st TO INTRODUCE LEAD FREE COLUMN PIPES IN INDIA

1st TO INTRODUCE POLYMER BASED INDUSTRIAL PIPING SYSTEM IN INDIA

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1st TO INTRODUCE CPVC PIPING FOR AUTOMATIC FIRE SPRINKLER SYSTEM IN INDIA

ASTRAL, INDIA'S PROGRESSIVE BUILDING MATERIALS COMPANY

Established in 1996 with the aim to manufacture best-in-globe plastic piping systems, Astral Pipes fulfils emerging piping needs of millions of houses and adds extra mileage to India's developing real estate fraternity with the hallmark of unbeaten quality and innovative piping solutions. Keeping itself ahead of the technology curve, Astral has always been a front runner in the piping category by bringing innovation and getting rid of old, primitive and ineffective plumbing methods. Bringing CPVC in India, and pioneering in this technology, have set Astral apart and its highest quality enabled it to obtain NSF approval for its CPVC pipes and fittings. Astral went beyond the category codes by launching many industry firsts, like launching India's first lead-free uPVC pipes for plumbing as well as for stream water, just to name a few.

Astral Pipes offers the widest product range across this category when it comes to product applications. Astral Pipes is equipped with production facilities at Santej and Dholka in Gujarat, Hosur in Tamil Nadu, Ghiloth in Rajasthan, Sangli & Aurangabad in Maharashtra, and Sitarganj in Uttarakhand to manufacture plumbing systems, drainage systems, agriculture systems, fire sprinkler piping systems, industrial piping and electrical conduit pipes with all kinds of necessary fittings.

Astral Pipes' Infrastructure division Rex offers a comprehensive product range including corrugated piping for drainage and cables, polyolefin cable channels, sewage treatment plants, plastic sheathing ducts, suction hoses, and sub-surface drainage systems. This range helps Astral to establish a strong foothold in infrastructure and agriculture sector in the constantly evolving business of piping.

In 2014, Astral forayed into the adhesives category by acquiring UK-based Seal It Services Ltd. and Kanpur based Resinova Chemie Ltd., which manufacture adhesives, sealants and construction chemicals. With five manufacturing facilities now in this business segment, Astral has strengthened its presence in the category and made rapid inroads.

In the year 2020, Astral has expanded its product portfolio and entered into the Water Tanks Segment. The water tank segment is an expanded domain of plumbing and water supply with a huge nationwide potential. Astral Pipes manufactures water tanks from its Santej and Aurangabad manufacturing facilities and slowly will begin manufacturing water tanks from other piping units. The new addition in the product offering will help Astral author a next chapter of success and will establish it as a prominent player in building materials industry.

ADHESIVES

EPOXY ADHESIVES & PUTTY
SILICONE SEALANTS
CONSTRUCTION CHEMICALS **PVA**
CYANOACRYLATE **SOLVENT CEMENTS**
TAPES **POLYMERIC FILLING COMPOUND**
ANAEROBIC ADHESIVES
INDUSTRIAL ADHESIVES
INSTANT HAND SANITIZER
SURFACE CLEANING PRODUCTS

PIPING

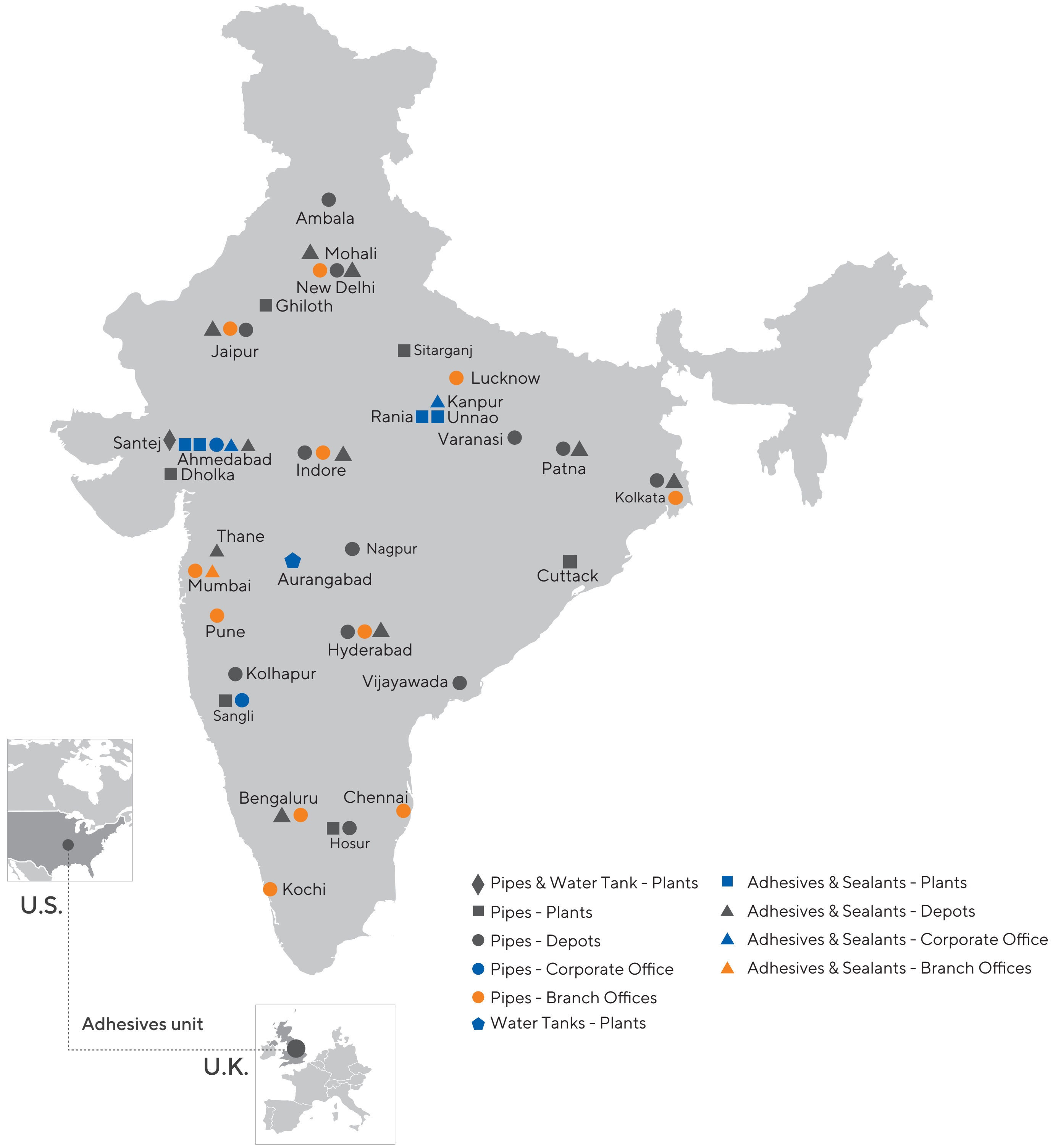
PLUMBING PIPES & FITTINGS
CPVC, PVC & PEX
SEWERAGE DRAINAGE PIPES & FITTINGS
AGRICULTURE PIPES & FITTINGS
INDUSTRIAL PIPES & FITTINGS
FIRE SPRINKLERS PIPES & FITTINGS
CONDUIT & CABLE PROTECTION
ANCILLARY PRODUCTS
URBAN INFRASTRUCTURE
DUCTING

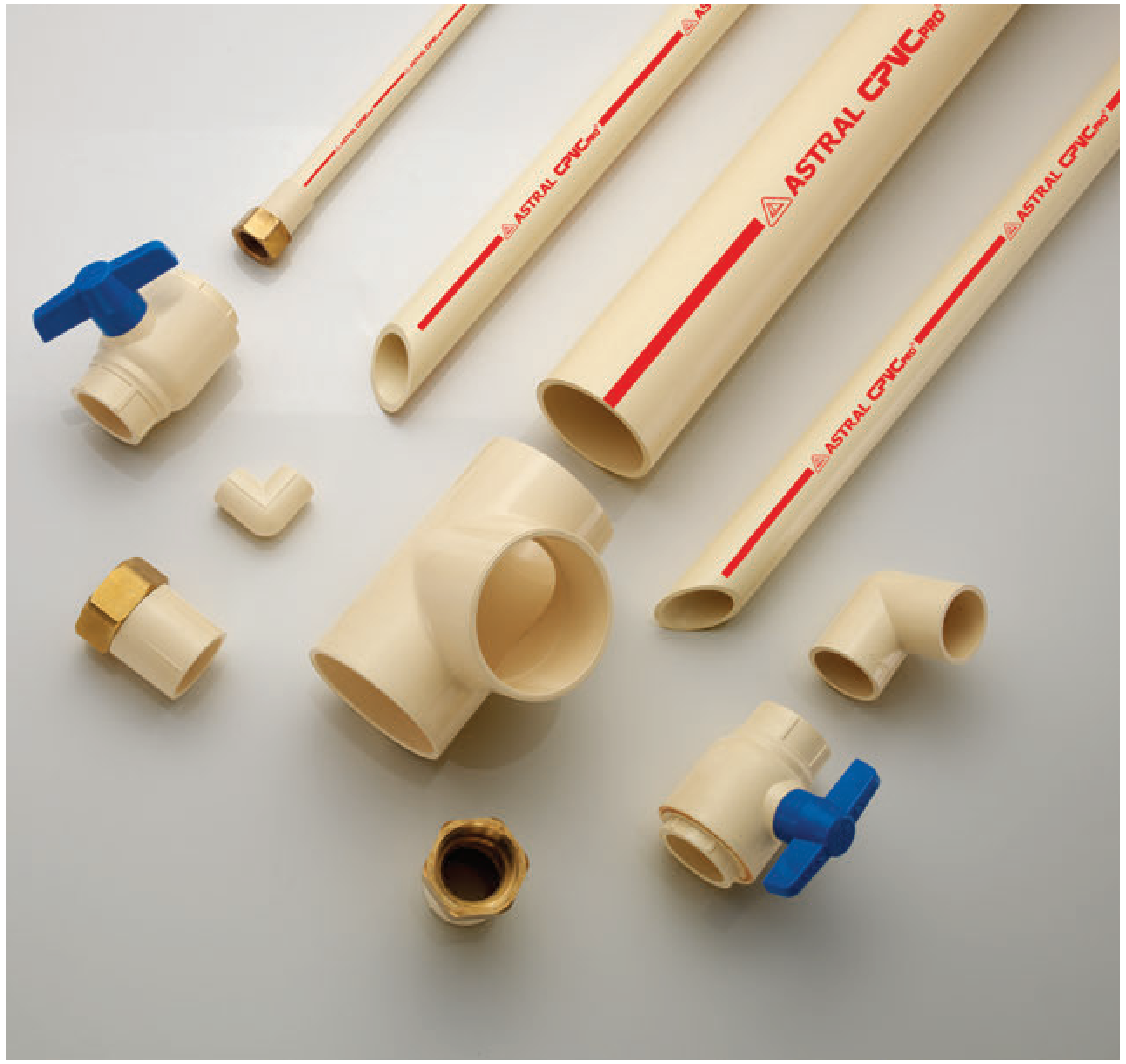
INNOVATION & RECOGNITIONS

- First to introduce CPVC piping system in India (1999)
- First to launch lead free uPVC piping system in India (2004)
- Corp Excel- National SME Excellence Award (2006)
- First to get NSF Certification for CPVC piping system in India (2007)
- First to launch lead-free uPVC column pipes in India (2012)
- Enterprising Entrepreneur of the year (2012-13)
- Business Standard Star SME of the year (2013)
- Inc. India Innovative 100 for Smart Innovation under category of 'Technology' (2013)
- India's Most Promising Brand Award (2014)
- Value Creator Award during the first ever Fortune India Next 500 (2015)
- India's Most Trusted Pipe Brand Award (2016, 2019 & 2020)
- ET Inspiring Business Leaders of India Award (2016)
- India's Most Attractive Pipe Brand Award (2016)
- Fortune India 500 Company (2016)
- Consumer Validated Superbrands India (2017, 2019 & 2021)
- India's Most Desired Brand based on TRA's Brand Trust Report (2021)

MARKETING NETWORK

Astral has a marketing network of more than 800 distributors and 30,000 dealers spread all over India with branch offices at Mumbai, Pune, Delhi, Bengaluru, Chennai, Hyderabad, Jaipur, Lucknow and Kochi. Apart from that Astral has its own warehouses at Vijaywada, Hyderabad, Delhi, Kolhapur, Kolkata, Nagpur, Indore, Patna, Varanasi, Jaipur & Hosur to deliver the material as quick as possible. More than 400 techno marketing professionals and administrative personnel are on the board to coordinate with architects, plumbing contractors and plumbers to utilize the best plumbing techniques and to get the best from the products.





ABOUT ASTRAL CPVC PRO®

ASTRAL CPVC PRO is a class apart in the category, it is more than just a hot and cold plumbing system. To us it is an initiative, to deliver a world class plumbing solution.

ASTRAL CPVC PRO pipe and fittings, manufactured by Astral Poly Technik Limited, are made from the specialty plastic, chemically known as Chlorinated Poly Vinyl Chloride [CPVC]. The CPVC compound shall meet cell class DP 110-2-3-2 as per IS:15778 and a maximum service temperature up to 93°C. The compound is carefully designed in our R & D and backed by our own expertise of manufacturing CPVC piping system from 19 years, which will give excellent results in all applications for CPVC piping system. It is unique combination of highest Impact resistance without any loss in pressure bearing capacity / Tensile strength or Vicat softening temperature. This will ensure best trouble free service and also stood notch above the initial installation issues of cracking / damages due to handling, storage and installation.

The 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 (Class 1 & Class 2 respectively as per IS:15778) . The fittings are produced as per SDR 11. The pipes and fittings in SDR 11 class is also complies to ASTM standard. All Astral 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 requirement as per ASTM standard. Apart from having the same physical properties, SDR 11 and SDR 13.5 which are having different wall thickness and therefore, at any given temperature, they have different pressure ratings. For e.g.

PIPE TEMPERATURE PRESSURE RATING (°C)

GRADE	UNIT	23°C	82°C
SDR 11	psi	400	100
	kg/cm²	28.1	7.0
SDR 13.5	psi	320	80
	kg/cm²	22.5	5.6

Astral also produces CPVC PRO pipes in iron pipe size (IPS), available sizes are 65 mm (2½") to 300 mm (12") in SCH 40 and SCH 80 which meets the requirements of ASTM F 441. The pressure ratings varies with schedule pipe size and temperature. CPVC pipes of Copper Tube Size (CTS) dimensions can also be connected to CPVC (IPS) dimensions by using IPS x CTS fittings.

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. SCH 40.

ASTM F439 Socket-Type Chlorinated Polyvinyl Chloride Plastic Pipe Fittings. SC H 80.

ASTM D2774 Underground installation of Thermoplastic pipes.

IS:15778 Chlorinated poly vinyl chloride (CPVC) pipe for potable hot & cold water distribution supplies.

PRODUCT RANGE

Class 1 (SDR 11) & Class 2 (SDR 13.5): 15 mm (½") to 50 mm (2") CTS -Confirming to IS:15778:2007 As per ASTM D2846

SCH 40: 65 mm (2½") to 100 mm (4") IPS As per ASTM F441 & ASTM F438

SCH 80: 65 mm (2½") to 300 mm (12") IPS As per ASTM F441 & ASTM F439

MARKING & UNIFORMITY

Pipes and fittings made from CPVC compound are clearly marked with the manufacturers trademark, material designation, applicable ASTM standard.

SDR 11 Pipe: Tan coloured with red stripe

SDR 13.5 Pipe: Tan coloured with brown stripe

SDR 11 fittings: Tan colour

SCH 40 Pipe: Tan colour with brown stripe

SCH 40 fittings: Tan colour

SCH 80 Pipe: Tan colour with red stripe

SCH 80 fittings: Tan colour / Grey colour

ASTRAL CPVC PRO PIPE AND FITTINGS ARE THE BEST CHOICE FOR HOT AND COLD POTABLE WATER DISTRIBUTION

THE RAW MATERIAL

Astral CPVC Pro pipes and fittings are manufactured with specially designed CPVC Compound formulated by Astral itself. The compound is mixture of imported CPVC Resin and other ingredients like Impact Modifiers, Lubricants, UV stabilizers etc.

The compound for pipes and fittings are carefully designed in our R&D facility and checked for different properties like Dynamic Thermal Stability, Fusion, Torque and all other rheological properties. Thus designed CPVC compound can give highest processibility as well as best Physical and Mechanical properties.

The compound meets or exceed all requirements for cell classification for IS:15778 and ASTM D2846.

The material is also approved by NSF for its safe use with potable water and thus completely safe for drinking water.

ABOUT NSF APPROVAL

ASTRAL Poly Technik Ltd. is proud to announce that ASTRAL CPVC PRO is approved by NSF International, a leading global independent public health and safety organization. To receive certification, Astral Poly Technik Ltd. submitted product samples to NSF that underwent rigorous testing to recognized standards and agreed to unannounced manufacturing facility audits and periodic retesting to verify continued conformance to the standards. Find us in the NSF water listings by visiting http://www.nsf.org/ certified-products-systems.

ABOUT NSF INTERNATIONAL

NSF International is a global independent organization that writes standards and protocols and tests and certifies products for the food, water and consumer goods industries to minimize adverse health effects and protect the environment. NSF operates in over 165 countries. Founded in 1944, NSF is a Pan American Health Organization/World Health Organization Collaborating Center on Food Safety, Water Quality and Indoor Environment.

WHY ASTRAL
CPVC PRO

INTRODUCED CPVC FOR
THE FIRST TIME IN INDIA

There was a time when CPVC pipes were not accepted by the industry. This was mainly because GI pipes were 30% cheaper than CPVC pipes. So strength of steel and cost were major factors why GI pipes were norms. But ASTRAL introduced CPVC pipes in India for the first time embarking upon anti-corrosion and hot water compatibility. Since then, ASTRAL CPVC has been a flagship CPVC product leading the way in the market.

1st TO INTRODUCE CPVC IN INDIA

HIGHEST NUMBER OF
CERTIFICATIONS

NSF, BIS and IAPMO Certifications : ASTRAL the only pipe manufacturing company in India having most prestigious quality approval from National Sanitation Foundation (NSF), Bureau of Indian Standards (BIS) and certifications from IAPMO.

NSF® Certified to NSF/ANSI 61

IS : 15778

UPC – I

MCGM APPROVED

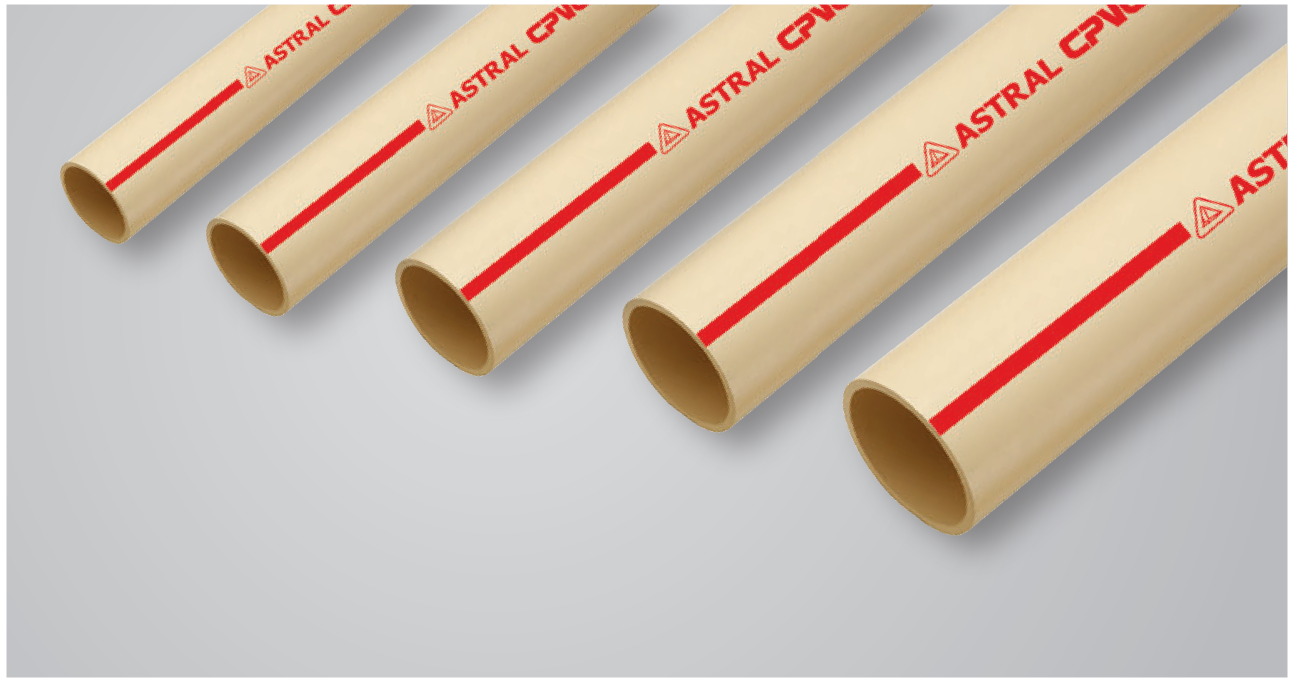
*ONLY THOSE PRODUCTS BEARING THE ABOVE MARKS ARE CERTIFIED.

STATE OF THE ART
MANUFACTURING

ASTRAL is equipped with state of art manufacturing facilities at Santej, Dholka, Hosur and Ghiloth plants. High speed and accurate extruders and injection molding machines including innovative manufacturing techniques being used to manufacture the ultra modern, errorless ASTRAL CPVC PRO pipes and fittings.

WIDEST
PRODUCT RANGE

ASTRAL is the only company that provides the pipes with sizes ranging from 1⁄2" to 12" diameter. Hence you can meet any requirement with this widest range of CPVC pipes.



TOTAL BACKWARD
INTEGRATION

All of Astral's CPVC Pipes and Fittings are made from CPVC Compound which is manufactured and controlled by Astral at every stage of the process. This backward integration helps us consistently maintain the highest quality for all pipes and fittings.

SKILL DEVELOPMENT
INITIATIVES FOR PLUMBERS

Astral provides training to plumbers and plumbing contractors throughout the year by updating them about modern plumbing techniques and to do plumbing work more effectively and professionally.

KEY PROPERTIES

CORROSION RESISTANCE

ASTRAL® CPVC PRO 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. ASTRAL® CPVC PRO pipe keeps pure water pure.

LOWER BACTERIAL GROWTH

Bacteria build up with CPVC is far lower than with alternative piping materials due to very smooth internal surface. It does not deteriorate quality of water and prevents contamination, unpleasent odour, bad taste and discolouration of water.

NO SCALE, PIT OR LEACH FORMATION

Even after years of use in the most aggressive conditions, this pipe won't corrode, standing against low pH water, coastal salt, air exposures and corrosive soils. It stays as solid and reliable as the day it was installed, maintaining full water carrying capacity.

EASY PLUMBING 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. Also due to superior insulation properties compare to copper and GI, this system saves installation cost.

UNAFFECTED BY CHLORINE IN WATER

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

HOT WATER COMPATIBLE

ASTRAL® CPVC PRO pipe is compatible with both hot and cold water. It withstand very high temperature upto 93°C. Many solar, electric and gas water heaters have CPVC piping system for heat efficiency and lower installation cost.

LOW THERMAL EXPANSION

ASTRAL® CPVC PRO pipe has a lower coefficient of thermal expansion, reducing the amount that the pipe expands when hot water is running, again reducing unsightly 'looping' of the pipe.

FIRE SAFETY

CPVC has a Limiting Oxygen Index (LOI) of 60. Thus in air, ASTRAL® CPVC PRO pipe does not support combustion. No flaming drips, does not increase the fire load, low flame spread, low smoke generation.

TOUGH, RIGID MATERIAL

ASTRAL® CPVC PRO pipe has a much higher strength than other thermoplastics used in plumbing. Hence, it needs less hangers and supports and there is no unsightly looping of the pipe. It has a higher pressure bearing capability, leading to the same flow rate with a smaller size. Also having high UV resistance, life span is more than 50 years.

APPROVED WORLD WIDE

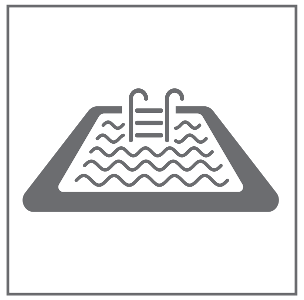
CPVC plumbing system is approved for contact with potable water in wide range of countries including USA, UK, Canada, Germany, France, The Netherlands, Middle East, Africa etc.

FIELDS OF APPLICATIONS

Astral CPVC PRO Pipes are ideal for Hot and Cold water applications in

- Homes, apartments
- Hotels, resort
- Hospitals
- High and low rise buildings
- Corporate and commercial houses
- Academic institutes

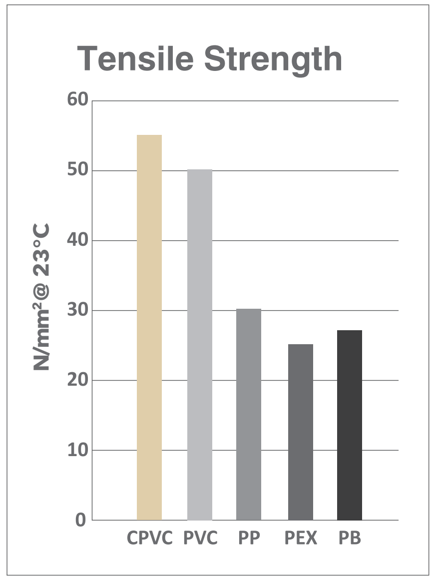
etc. for pure and hygienic water supply.

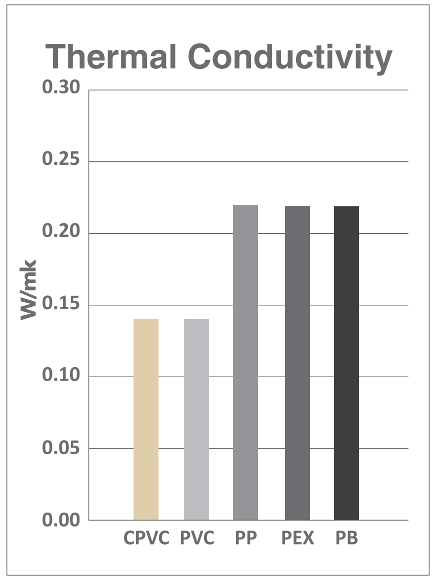


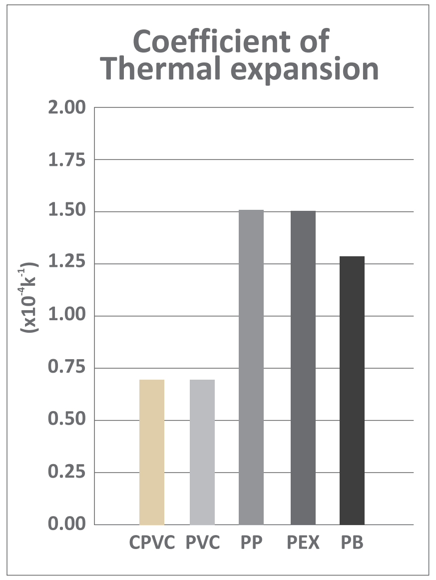
BASIC PHYSICAL PROPERTIES

PROPERTY	TEST METHOD	ENGLISH UNIT	SI UNIT
GENERAL PROPERTIES			
Specific Gravity @ 23°C	ASTM D792	1.50 g/cm³	1.50 g/cm³
Specific volume @ 23°C	-	0.666 cm³/g	0.666 cm³/g
Water Absorption @ 23°C	ASTM D570	0.02%	0.02%
Water Absorption @ 100°C	ASTM D570	0.50%	0.50%
Cell Class	ASTM D1784	23447-B	D.P.110-2-3-2
Rockwell Hardness @ 23°C	ASTM D785	119	-
MECHANICAL PROPERTIES			
Izod Impact (Notched) @ 23°C	ASTM D256	4.5ft.lbs/in	267 J/m
Tensile Strength @ 23°C	ASTM D638	8000 psi	55 N/mm²
Tensile Modulus @ 23°C	ASTM D638	3,94,000 psi	2710 N/mm²
Flexural Strength @ 23°C	ASTM D790	15,100 psi	104N/mm²
Flexural Modulus @ 23°C	ASTM D790	4,15,100 psi	2860N/mm²
Compressive Strength @ 23°C	ASTM D695	10,200 psi	71 N/mm²
Compressive Modulus @ 23°C	ASTM D695	1,97,500 psi	1360 N/mm²
THERMAL PROPERTIES			
Coefficient of Thermal Expansion	ASTM D696	$3.4X10^{-5}$ in/in/°f	$6.3 X10^{-5}$ m/m/°K
Thermal Conductivity	ASTM C177	0.95 BTU/(hr.ft².°F)	0.14 W/mk
Heat Distortion Temperature	ASTM D648	221°F	105°C
Heat Capacity @ 23°C	DSC	0.21 BTU/lb°F	0.90 J/gK
Heat Capacity @ 100°C		0.26 BTU/lb°F	1.10 J/gK
FLAMMABILITY			
Flammability Rating	UL94	0.062 inch/ 0.157cm	V0, 5VA & 5VB
Flame spread	ASTM E84	15	-
Smoke developed	ASTM E84	70-125	-
Limiting oxygen index	ASTM D2863	60%	-
ELECTRICAL			
Dielectric Strength	ASTM D147	1250 V/mil	492,000 V/cm
Dielectric Constant @ 60Hz, -1°C	ASTM D150	3.7	3.7
Power Factor @ 1000 Hz	ASTM D150	0.007%	0.007%
Volume Resistivity @ 23°C	ASTM D257	$3.4x10^{15}$ ohm/cm	$3.4x10^{15}$ ohm/cm

Note: Above values are typical values. It should be used as a general recommendation. Do not consider as a specification







TECHNICAL DETAILS

Outside Diameters and Wall Thicknesses For CPVC 4120, SDR 11 Plastic Pipe As Per ASTM D-2846 & conforming to IS: 15778

Nominal Size			Outside Diameter, Inch (mm)				Wall Thickness, Inch (mm)				Pipe Pr. R. psi (kg/cm²)			
cm	(mm)	in.	Average		Tolerance		Minimum		Tolerance		73.4°F	(23°C)	180°F	(82°C)
1.5	(15)	½*	0.625	(15.9)	± 0.003	(0.08)	0.068	(1.73)	+ 0.020	(0.51)	400	(28.1)	100	(7.0)
2.0	(20)	¾	0.875	(22.2)	± 0.003	(0.08)	0.080	(2.03)	+ 0.020	(0.51)	400	(28.1)	100	(7.0)
2.5	(25)	1	1.125	(28.6)	± 0.003	(0.08)	0.102	(2.59)	+ 0.020	(0.51)	400	(28.1)	100	(7.0)
3.2	(32)	1¼	1.375	(34.9)	± 0.003	(0.08)	0.125	(3.18)	+ 0.020	(0.51)	400	(28.1)	100	(7.0)
4.0	(40)	1½	1.625	(41.3)	± 0.004	(0.10)	0.148	(3.76)	+ 0.020	(0.51)	400	(28.1)	100	(7.0)
5.0	(50)	2	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.

Pr. R. = Pressure Rating

Outside Diameters and Wall Thicknesses For CPVC 4120, SDR 13.5 Plastic Pipe conforming to IS: 15778

Nominal Size			Outside Diameter, Inch (mm)				Wall Thickness, Inch (mm)				Pipe Pr. R. psi (kg/cm²)			
cm	(mm)	in.	Average		Tolerance		Minimum		Tolerance		73.4°F	(23°C)	180°F	(82°C)
1.5	(15)	½*	0.625	(15.9)	± 0.003	(0.08)	0.055	(1.40)	+ 0.020	(0.51)	320	(22.5)	80	(5.6)
2.0	(20)	¾	0.875	(22.2)	± 0.003	(0.08)	0.065	(1.65)	+ 0.020	(0.51)	320	(22.5)	80	(5.6)
2.5	(25)	1	1.125	(28.6)	± 0.003	(0.08)	0.083	(2.12)	+ 0.020	(0.51)	320	(22.5)	80	(5.6)
3.2	(32)	1¼	1.375	(34.9)	± 0.003	(0.08)	0.102	(2.59)	+ 0.020	(0.51)	320	(22.5)	80	(5.6)
4.0	(40)	1½	1.625	(41.3)	± 0.004	(0.10)	0.120	(3.06)	+ 0.020	(0.51)	320	(22.5)	80	(5.6)
5.0	(50)	2	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.

Pr. R. = Pressure Rating

Outside Diameters, Wall Thickness & Pressure Rating For CPVC 4120, Schedule 40 Piping System As per ASTM F 441

Nominal Size			Outside Diameter, Inch (mm)				I.D. Inch (mm)		Wall Thickness, Inch (mm)				Pipe Pr. R. psi (kg/cm²)	
cm	(mm)	in.	Average		Tolerance		Average		Minimum		Tolerance		73.4°F	(23°C)
6.5	(65)	2½	2.875	(73.0)	± 0.007	(0.18)	2.444	(62.07)	0.203	(5.16)	+ 0.024	(0.61)	300	(21.10)
8.0	(80)	3	3.500	(88.9)	± 0.008	(0.20)	3.041	(77.26)	0.216	(5.49)	+ 0.026	(0.66)	280	(18.28)
10.0	(100)	4	4.500	(114.3)	± 0.009	(0.23)	3.998	(101.55)	0.237	(6.02)	+ 0.028	(0.71)	220	(15.47)

Pr. R. = Pressure Rating

Outside Diameters, Wall Thickness & Pressure Rating For CPVC 4120, Schedul 80 Piping System As per ASTM F 441

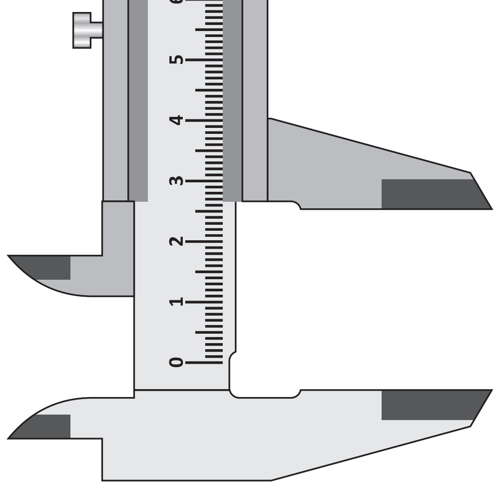
Nominal Size			Outside Diameter, Inch (mm)				I.D. Inch (mm)		Wall Thickness, Inch (mm)				Pipe Pr. R. psi (kg/cm²)	
cm	(mm)	in.	Average		Tolerance		Average		Minimum		Tolerance		73.4°F	(23°C)
6.5	(65)	2½	2.875	(73.0)	± 0.007	(0.18)	2.288	(58.14)	0.276	(7.01)	+ 0.033	(0.84)	420	(29.53)
8.0	(80)	3	3.500	(88.9)	± 0.008	(0.20)	2.864	(72.75)	0.300	(7.62)	+ 0.036	(0.91)	370	(26.01)
10.0	(100)	4	4.500	(114.3)	± 0.009	(0.23)	3.778	(95.97)	0.337	(8.56)	+ 0.040	(1.02)	320	(22.50)
15.0	(150)	6	6.625	(168.3)	±0.011	(0.28)	5.710	(145.04)	0.432	(10.97)	+ 0.052	(1.32)	280	(19.69)
20.0	(200)	8	8.625	(219.1)	±0.015	(0.38)	7.565	(192.15)	0.500	(12.70)	+ 0.060	(1.52)	250	(17.57)
25.0	(250)	10	10.750	(273.1)	±0.015	(0.38)	9.493	(241.12)	0.593	(15.06)	+ 0.071	(1.80)	230	(16.17)
30.0	(300)	12	12.750	(323.90)	±0.015	(0.38)	11.294	(286.87)	0.687	(17.45)	+ 0.082	(2.08)	230	(16.17)

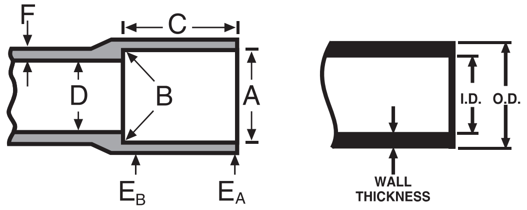
Pr. R. = Pressure Rating

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

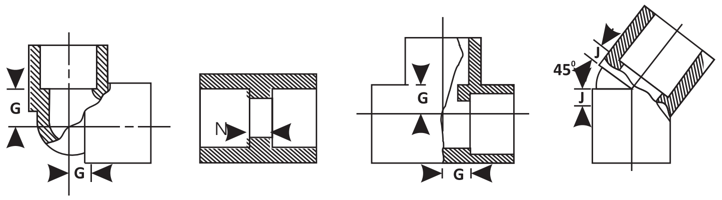
N.B. : For obtaining working pressure in system, multiply the maximum pressure with derating factor at the working temperature of system.
* Valves, Unions & Speciality Products have different elevates temperature rating than pipe.





Nominal Size		Socket Entrance Diameter inch (mm)		Socket Bottom Diameter inch (mm)		Socket Length inch (mm)	Inside Diameter inch (mm)	Wall Thickness in (mm)		
								Socket Enterance	Socket Bottom	'F' min.
(in.)	(mm)	'A' Average	'A' Tolerance	'B' Average	'B' Tolerance	'C' min.	'D' min.	'E_A' min.	'E_B' min.	
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)

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



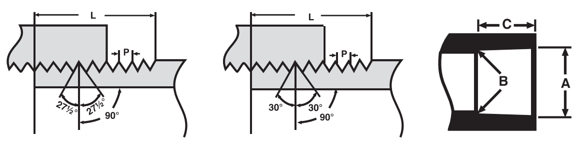
Nominal Size		Threads (Per Inch)	Effective Thread Length (L) inch	Pitch of Thread (P) inch
(mm)	(in.)			
15	½	14	0.5337	0.07143
20	¾	14	0.5457	0.07143
25	1	11½	0.6828	0.08696
32	1¼	11½	0.7068	0.08696
40	1½	11½	0.7235	0.08696
50	2	11½	0.7565	0.08696
65	2½	8	1.1375	0.12500
80	3	8	1.2000	0.12500
100	4	8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

American National Standard Taper Pipe Threads (NPT) Ansi Standard B1.20.1 ASTM Standard F1498

Nominal Size		(G) min. inch	(J) min. inch	(N) min. inch
(mm)	(in.)			
15	½	0.382	0.183	0.102
20	¾	0.507	0.235	0.102
25	1	0.633	0.287	0.102
32	1¼	0.758	0.339	0.102
40	1½	0.884	0.391	0.102
50	2	1.134	0.495	0.102

Minimum Dimensions from Center to End of Socket (Laying Length) for CPVC 4120, SDR 11 Plastic Tubing Fittings* Per ASTM D 2846

BSPT NPT



Nominal Size		Threads (Per Inch)	Effective Thread Length (L) mm	Pitch of Thread (P) mm
(mm)	(in.)			
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

BSP ISO 7/1 Parallel Threads

Nominal Size		Diameter (in)			Socket Length Minimum C (in)	
(mm)	(in.)	Socket Entrance A	Socket Bottom B	Tolerance	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

Basic Socket Dimensions
Schedule 40 CPVC Fittings As Per ASTM F 438
Schedule 80 CPVC Fittings As Per ASTM F 439

FLUID HANDLING CHARACTERISTICS OF ASTRAL CPVC PRO PIPES

LINEAR FLUID FLOW VELOCITY

The linear velocity of a flowing fluid in a pipe is calculated from :

$$V = \frac{0.4085g}{d^2}$$

Where V = Linear fluid flow velocity in feet per second
g = Flow rate in gallons per minute
d = Inside diameter of pipe in inches

The values in the following tables are based on this formula. These values are accurate for all fluids.

Linear fluids flows velocity in a system should generally be limited to 5 ft/s, particularly for pipe size 6" and grater. Following this guideline will minimize risk of hydraulic shock damage due to water hammer surge pressures.

FRICTION LOSS IN PIPES

A great advantage that ASTRAL CPVC PRO Pipe enjoys over its metallic competitors is a smooth inner surface which is resistant to scaling and fouling. This means that friction pressure losses in the fluid flow are minimized from the beginning and do not significantly increase as the system ages, as can be the case with metal pipes subject to scaling and fouling.

The Hazen-Willims formula is the generally accepted method of calculating friction head losses in piping systems. The values in the following fluid tables are based on this formula and a surface roughness constants for other piping materials are given beside:

$$f = 0.2083 \times \left(\frac{100}{C}\right)^{1.852} \frac{g^{1.852}}{d^{4.8655}}$$

Where f = Friction head in feet of water per 100 feet of pipe
d = Inside diameter of pipe in inches
g = Flow rate in gallons per minute
c = pipe surface roughness constant

CONSTANT (C) TYPE OF PIPE

150	-	CPVC pipe, new-40 years old
130-140	-	steel / cast iron pipe, new
125	-	steel pipe, old
120	-	cast iron, 4 - 12 years old galvanized steel
100	-	cast iron, 13 - 20 years old
60 - 80	-	cast iron, worn / pitted

FRICTION LOSS IN FITTINGS

Friction losses through fittings are calculated from the equivalent length of straight pipe which would produce the same friction loss in the fluid. The equivalent lengths of pipe for common fittings are given here.

Nominal Size (in.)	90° Standard Elbow (feet)	45° Standard Elbow (feet)	Standard Tee Run Flow (feet)	Standard Tee Branch Flow (feet)
½	1.55	0.83	1.04	3.11
¾	2.06	1.10	1.37	4.12
1	2.62	1.40	1.75	5.25
1¼	3.45	1.84	2.30	6.90
1½	4.03	2.15	2.68	8.05
2	5.17	2.76	3.45	10.30
2½	6.10	3.30	4.10	12.20
3	7.60	4.10	5.10	15.20
4	10.00	5.30	6.70	20.00
6	15.10	8.00	10.10	30.20
8	19.90	10.60	13.20	39.70
10	24.90	13.30	16.60	49.90
12	29.70	15.90	19.80	59.40

WATER HAMMER SURGE PRESSURE

Whenever the flow rate of fluid in a pipe is changing, there is a surge in pressure known as water hammer, The longer the line and the faster the fluid is moving, the greater the hydraulic shock will be. Water hammer may be caused by opening or closing a valve, starting or stopping a pump, or the movement of entrapped air through the pipe. The maximum water hammer surge pressure may be calculated from :

$$P_{wh} = \frac{\rho \Delta V}{g_c}\left[\frac{\rho}{g_c}\left(\frac{1}{K}+\frac{d}{bE}\right)\right]^{½}$$

Where Pwh = Maximum surge pressure, psi
p = Fluid density
ΔV = Change in fluid velocity
gc = Gravitational constant
K = Bulk modulus of elasticity of fluid
b = Pipe wall thickness
E = Pipe material bulk modulus of elasticity
d = Pipe inside diameter

The value in the following tables are based on this formula at 73°F and the assumption that water flowing at a given rate of gallons per minute is suddenly completely stopped. At 180°F, the surge pressure is approximately 15% less. The value for fluids other then water may be by multiplying by the square root of the fluid's specific gravity.

THE WATER HAMMER SURGE PRESSURE PLUS THE SYSTEM OPERATING PRESSURE SHOULD NOT EXCEED THE RECOMMENDED WORKING PRESSURE RATING OF THE SYSTEM.

In order to minimize hydraulic shock due to water hammer, linear fluid flow velocity should generally be limited to 5ft/s. Velocity at system start-up should be limited to 1 ft/s during filling until it is certain that all air has been flushed from the system and pressure has been brought up to operating conditions. Pump should not be allowed to draw in air.

Where necessary, extra protective equipment may be used to prevent water hammer damage, such equipment might include pressure relief valves, shock absorbers, surge arrestors and vacuum air relief valves.

FRICTION LOSS AND FLOW VELOCITY FOR SDR 11 CTC CPVC THERMOPLASTIC PIPE

(Friction head and Friction Loss are per 100 feet of pipe)

Gallons Per Minute	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)
	½ in			¾ in			1 in			1¼ in			1½ in			2 in		
1	1.71	3.19	1.38	0.80	0.50	0.22	0.48	0.15	0.06									
2	3.42	11.53	5.00	1.60	1.82	0.79	0.96	0.53	0.23									
3	5.16	24.43	10.59	2.40	3.85	1.67	1.44	1.12	0.49									
4	6.83	41.62	18.04	3.20	6.55	2.84	1.93	1.91	0.83									
5	8.54	62.91	27.27	4.00	9.91	4.29	2.41	2.89	1.25	1.61	1.09	0.47	1.16	0.49	0.21	0.68	0.13	0.06
6	10.25	88.18	38.23	4.79	13.89	6.02	2.89	4.05	1.76									
7	11.96	117.32	50.86	5.59	18.47	8.01	3.37	5.39	2.34									
8	13.67	150.23	65.13	6.39	23.66	10.26	3.85	6.90	2.99									
9	15.38	186.85	81.00	7.19	29.42	12.76	4.33	8.59	3.72									
10	17.08	227.11	98.45	7.99	35.76	15.50	4.82	10.43	4.52	3.23	3.94	1.71	2.31	1.75	0.76	1.35	0.49	0.21
15				11.99	75.78	32.85	7.22	22.11	9.58	4.84	8.35	3.62	3.47	3.71	1.61	2.03	1.03	0.45
20				15.98	129.11	55.97	9.63	37.67	16.33	6.46	14.23	6.17	4.63	6.33	2.74	2.70	1.76	0.76
25							12.04	56.94	24.69	8.07	21.51	9.33	5.78	9.56	4.15	3.38	2.66	1.15
30							14.45	79.82	34.60	9.68	30.15	13.07	6.94	13.40	5.81	4.05	3.73	1.62
35							16.86	106.19	46.03	11.30	40.11	17.39	8.09	17.83	7.73	4.73	4.96	2.15
40										12.91	51.37	22.27	9.25	22.83	9.90	5.40	6.35	2.75
45										14.52	63.89	27.70	10.41	28.40	12.31	6.08	7.89	3.42
50										16.14	77.66	33.66	11.56	34.52	14.96	6.75	9.60	4.16
55										17.75	92.65	40.16	12.72	41.18	17.85	7.43	11.45	4.96
60													13.88	48.38	20.97	8.10	13.45	5.83
70													16.19	64.37	27.90	9.46	17.89	7.76
80																10.61	22.91	9.93
90																12.16	28.50	12.35
100																13.51	34.64	15.02
125																16.89	52.37	22.70

CAUTION : Flow velocity should not exceed 5 feet per second. Velocities in excess of 5 feet per second may result in system failure and property damage.

CARRYING CAPACITY AND FRICTION LOSS FOR SCHEDULE 40 CPVC THERMOPLASTIC PIPE

(Independent variables : Gallons per minute and nominal pipe size O.D. • Dependent variables : Velocity, Friction head and pressure drop per 100 feet of pipe, interior smooth.)

Gallons Per Minute	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Maximum Surge Pressure (PSI)	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Maximum Surge Pressure (PSI)
	3 in				4 in			
1								
3								
5								
7								
9								
10	0.441	0.031	0.013	7.870				
15	0.662	0.066	0.029	11.805				
20	0.883	0.113	0.049	15.740	0.511	0.030	0.013	8.420
25	1.103	0.170	0.074	19.675	0.639	0.045	0.019	10.525
30	1.324	0.238	0.103	23.610	0.767	0.063	0.027	12.630
35	1.545	0.317	0.137	27.545	0.894	0.084	0.036	14.735
40	1.766	0.406	0.176	31.480	1.022	0.107	0.046	16.840
45	1.986	0.505	0.218	35.415	1.150	0.134	0.058	18.945
50	2.207	0.614	0.265	39.350	1.278	0.162	0.070	21.050
60	2.648	0.861	0.372	47.220	1.533	0.228	0.098	25.260
70	3.090	1.145	0.495	55.090	1.789	0.303	0.131	29.470
80	3.531	1.486	0.634	62.960	2.044	0.388	0.168	33.680
90	3.973	1.824	0.755	70.830	2.300	0.483	0.209	37.890
100	4.414	2.217	0.958	78.700	2.555	0.587	0.254	42.100
125	5.517	3.351	1.449	98.375	3.194	0.887	0.383	52.625
150	6.621	4.699	2.031	118.050	3.833	1.243	0.537	63.150
175	7.724	6.250	2.701	137.725	4.472	1.654	0.715	73.675
200	8.828	8.003	3.459	157.400	5.111	2.117	0.915	84.200
250					6.389	3.201	1.384	105.250
300					7.666	4.487	1.939	126.300
350					8.944	5.969	2.580	147.350
400								
450								
500								
750								
1000								
1250								
1500								
1750								

Gallons Per Minute	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Maximum Surge Pressure (PSI)	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Maximum Surge Pressure (PSI)	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Maximum Surge Pressure (PSI)	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Maximum Surge Pressure (PSI)	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Maximum Surge Pressure (PSI)
	6 in				8 in				10 in				12 in				2½ in			
1																				
3																				
5																				
7																	0.478	0.014	0.020	9.142
9																	0.615	0.074	0.032	11.754
10																	0.683	0.090	0.039	13.060
15																	1.024	0.191	0.083	19.590
20																	1.367	0.326	0.141	26.120
25																	1.708	0.492	0.213	32.650
30																	2.050	0.690	0.298	39.180
35																	2.391	0.918	0.397	45.710
40																	2.733	1.176	0.508	52.240
45																	3.075	1.463	0.632	58.770
50																	3.415	1.778	0.768	65.300
60																	4.100	2.492	1.077	78.360
70																	4.783	3.315	1.433	91.420
80																	5.466	4.245	1.835	104.480
90																	6.149	5.280	2.282	117.540
100																	6.833	6.418	2.774	130.600
125																	8.541	9.702	4.192	163.250
150																				
175																				
200																				
250																				
300																				
350																				
400																				
450																				
500																				
750																				
1000																				
1250																				
1500																				
1750																				

CAUTION : Flow velocity should not exceed 5 feed per second. • CPVC pipe can not be used for compressed air service.

CARRYING CAPACITY AND FRICTION LOSS FOR SCHEDULE 80 CPVC THERMOPLASTIC PIPE

(Independent variables : Gallons per minute and nominal pipe size O.D. • Dependent variables : Velocity, Friction head and pressure drop per 100 feet of pipe, interior smooth.)

Gallons Per Minute	3 in				4 in				6 in				8 in			
	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Maximum Surge Pressure (PSI)	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Maximum Surge Pressure (PSI)	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Maximum Surge Pressure (PSI)	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Maximum Surge Pressure (PSI)
1																
3																
5																
7																
9																
10	0.498	0.042	0.018	10.500												
15	0.747	0.089	0.038	15.750												
20	0.996	0.151	0.065	21.000	0.570	0.039	0.017	11.220								
25	1.245	0.228	0.099	26.250	0.712	0.059	0.025	14.025								
30	1.494	0.320	0.138	31.500	0.855	0.082	0.036	16.830								
35	1.743	0.425	0.184	36.750	0.997	0.109	0.047	19.635								
40	1.992	0.545	1.235	42.000	1.140	0.140	0.061	22.440								
45	2.241	0.678	0.293	47.250	1.282	0.174	0.075	25.245								
50	2.490	0.823	0.356	52.500	1.425	0.212	0.092	28.050	0.627	0.029	0.012	11.500				
60	2.988	1.154	0.499	63.000	1.710	0.297	0.128	33.660	0.752	0.040	0.017	13.800				
70	3.486	1.536	0.664	73.500	1.995	0.395	0.171	39.270	0.877	0.054	0.023	16.100				
80	3.984	1.968	0.850	84.000	2.280	0.506	0.219	44.880	1.003	0.069	0.030	18.400				
90	4.482	2.446	1.057	94.500	2.565	0.629	0.272	50.490	1.128	0.085	0.037	20.700				
100	4.980	2.973	1.285	105.000	2.850	0.765	0.330	56.100	1.253	0.104	0.045	23.000				
125	6.225	4.494	1.943	131.250	3.562	1.156	0.500	70.125	1.567	0.157	0.068	28.750	0.892	0.040	0.017	15.375
150	7.469	6.299	2.723	157.500	4.274	1.620	0.700	84.150	1.880	0.220	0.095	34.500	1.071	0.056	0.024	18.450
175	8.714	8.381	3.622	183.750	4.987	2.155	0.932	98.175	2.193	0.292	0.126	40.250	1.249	0.074	0.032	21.525
200	9.959	10.732	4.639	210.000	5.699	2.760	1.193	112.200	2.560	0.374	0.162	46.000	1.427	0.095	0.041	24.600
250					7.124	4.173	1.804	140.250	3.133	0.566	0.244	57.500	1.784	0.144	0.062	30.750
300					8.549	5.849	2.528	168.300	3.760	0.793	0.343	69.000	2.141	0.202	0.087	36.900
350					9.974	7.781	3.363	196.350	4.386	1.055	0.456	80.500	2.498	0.268	0.116	43.050
400									5.013	1.351	0.584	92.000	2.855	0.343	0.148	49.200
450									5.639	1.680	0.728	103.500	3.212	0.427	0.185	55.350
500									6.266	2.042	0.883	115.000	3.589	0.519	0.224	61.500
750									9.399	4.327	1.870	172.500	5.353	1.100	0.475	92.250
1000													7.137	1.874	0.810	123.000
1250													8.921	2.833	1.224	153.750
1500													10.706	3.970	1.716	184.500
1750																
2000																

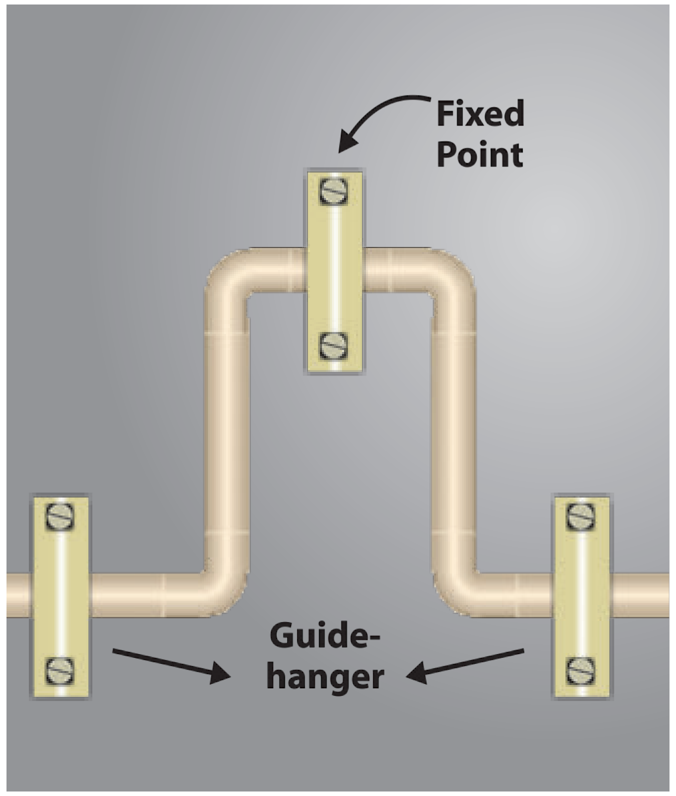
Gallons Per Minute	10 in				12 in				2½ in			
	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Maximum Surge Pressure (PSI)	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Maximum Surge Pressure (PSI)	Flow Velocity (Feet Per Second)	Friction Head Loss (Ft. of Water Per 100 Ft.)	Friction Pressure Loss (PSI Per 100 Ft.)	Maximum Surge Pressure (PSI)
1												
3												
5												
7									0.546	0.064	0.028	12.173
9									0.702	0.102	0.044	15.651
10									0.780	0.124	0.054	17.390
15									1.169	0.264	0.114	26.085
20									1.559	0.449	0.194	34.780
25									1.949	0.679	0.293	43.475
30									2.339	0.951	0.411	52.170
35									2.728	1.266	0.547	60.865
40									3.118	1.621	0.701	69.560
45									3.508	2.016	0.871	78.255
50									3.898	2.450	1.059	86.950
60									4.667	3.434	1.484	104.340
70									5.457	4.569	1.975	121.730
80									6.237	5.851	2.529	139.120
90									7.016	7.277	3.146	156.510
100									7.796	8.845	3.823	173.900
125									9.745	13.372	5.780	217.375
150												
175												
200	0.907	0.032	0.014	15.200								
250	1.133	0.048	0.021	19.000								
300	1.360	0.067	0.029	22.800								
350	1.587	0.089	0.038	26.600	1.121	0.038	0.016	18.550				
400	1.813	0.114	0.049	30.400	1.281	0.049	0.021	21.200				
450	2.040	0.142	0.061	34.200	1.441	0.061	0.026	23.850				
500	2.267	0.172	0.074	38.000	1.601	0.074	0.032	26.500				
750	3.400	0.365	0.158	57.000	2.402	0.157	0.068	39.750				
1000	4.533	0.621	0.269	76.000	3.202	0.267	0.115	53.000				
1250	5.667	0.939	0.406	95.000	4.003	0.403	0.174	66.250				
1500	6.800	1.316	0.569	114.000	4.803	0.585	0.244	79.500				
1750	7.934	1.751	0.757	133.000	5.604	0.752	0.325	92.750				
2000	9.067	2.243	0.969	152.000	6.404	0.963	0.416	106.000				

CAUTION : Flow velocity should not exceed 5 feed per second. • CPVC pipe can not be used for compressed air service.

THERMAL EXPANSION AND CONTRACTION

Like all piping material, ASTRAL CPVC PRO 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 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 more 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) length have been calculated for different pipe sizes and different run length 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

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

Where:

L = Loop Length (in.)

E = Moduls 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.)

THERMAL EXPANSION FORMULA

$$\Delta L = L_p C \Delta T$$

Where:

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

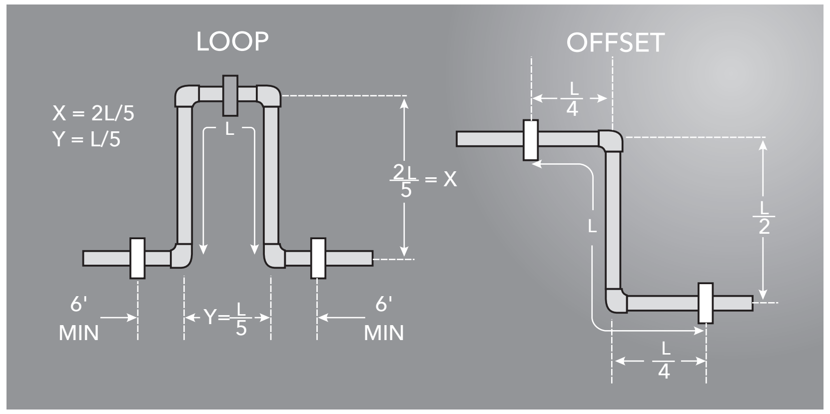
Lp = Length of pipe (in.)

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

= 3.4×10^{-5} in./ in./°F for CPVC

ΔT = Change in temperature (°F)

THERMAL EXPANSION AND CONTRACTION



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

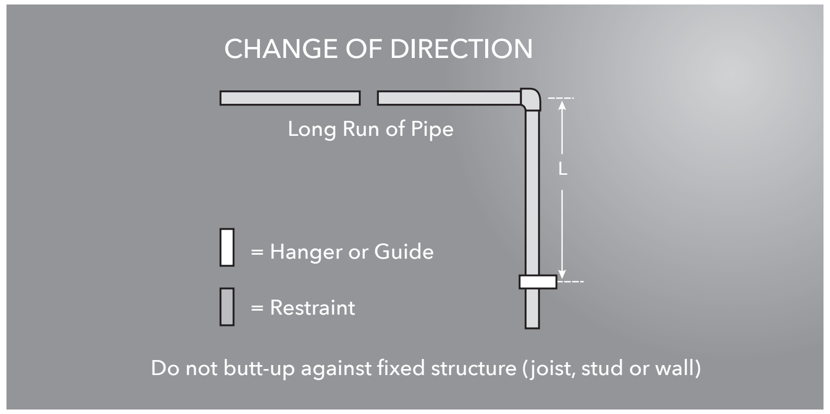


TABLE A

ASTRAL CPVC PRO pipe CTS PIPES
(ASTM D 2846)
Calculated Loop (Offset) Length with
ΔT of approx. 80°F in inches

Nominal Size mm	in.	Length of Run Feet 40	60	80	100
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

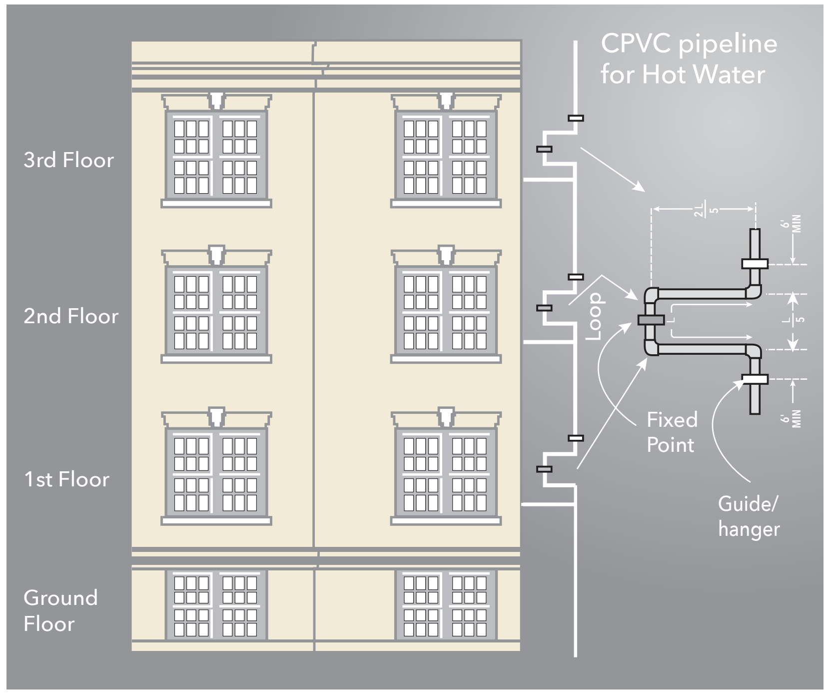


TABLE B

ASTRAL CPVC PRO IPS PIPES
(ASTM F 441)
Calculated Loop (Offset) Length with
ΔT of approx. 80°F in inches

Nominal Size cm	in.	Length of Run Feet 40	60	80	100
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 SUPPORTS

Horizontal & Vertical runs of ASTRAL CPVC PRO 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.

SPACING

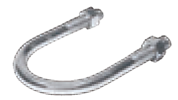
Nominal Pipe Size mm	in.	21°C (70°F) Ft.	(cm)	49°C (120°F) Ft.	(cm)	71°C (160°F) Ft.	(cm)	82°C (180°F) Ft.	(cm)
15	½	5.5	(167.70)	4.5	(137.16)	3.0	(91.44)	2.5	(76.20)
20	¾	5.5	(167.70)	5.0	(152.40)	3.0	(91.44)	2.5	(76.20)
25	1	6.0	(182.88)	5.5	(167.70)	3.5	(106.68)	3.5	(91.44)
32	1¼	6.5	(198.12)	6.0	(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)

BAND HANGER

ANCHOR STRAP

PIPE CLAMP

U-BOLT



UNDERGROUND INSTALLATION

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 back fill. Minimum width shall not be less than the greater of either the pipe outside diameter plus 16 inches or 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 large boulders are encountered, the trench bottom should be padded with bedding of compacted granular material to a thickness of at least 4 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.

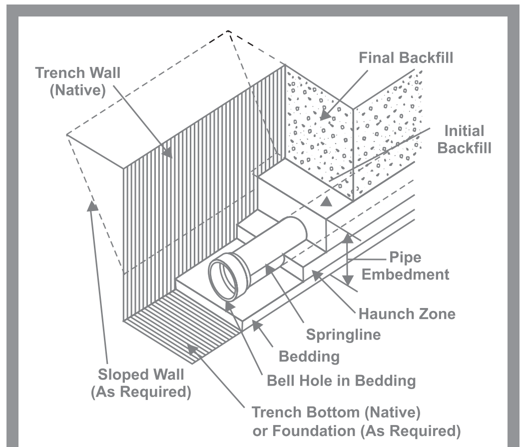


FIG. 1 Installation Terminology

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. Pipe must lie evenly on this surface throughout the entire length of its barrel. Excavation, bedding and backfill should be in accordance with the provision of the local Plumbing Code having jurisdiction.

BEDDING AND BACKFILLING

1. Even though sub-soil conditions vary widely from place to place, the pipe backfill should be stable and provide protection for the pipe.
2. 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 inch with each layer being sufficiently compacted to 85% to 95% compaction.
3. 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. If a tamper is not available, compacting should be done by hand.
4. The trench should be completely filled. The backfill should be placed and spread in fairly uniform layers to prevent any unfilled spaces or voids.

REQUIREMENT OF THERMALLY INSULATED CPVC PIPE

CPVC has much lower thermal conductivity then metals used in piping systems (0.14W / mk for CPVC verus > 400 W / mk for copper).

For this reason in most cases it is not necessary to thermally insulate CPVC piping. However the equation below can be used to calculat the approximate heat loss from CPVC pipes 1 meter length of pipe.

$$Q = \frac{\lambda}{e}\,\pi\left[\frac{di + do}{2}\right].\Delta T$$

Where
- Q = Heat loss per meter of pipe, W/m
- λ = Thermal conductivity. [W/mk] for CPVC, λ = 0.14 w/mk
- e = Thickness of pipe, mm .068
- π =3.1416
- di = Inside diameter, mm
- do = Outside diameter, mm
- ΔT = Temperature differential between inner and outer surface of pipe. This can be approximated to: T water. T ambient (K)

EXAMPLE

What is the heat loss/meter from a 20mm outside diameter CPVC pipe. wall thickness 2,3mm, with water flowing inside at 80°C and an ambient air temperature of 25°C?

$$Q = \frac{0.14}{2.3}\,3.1416\left[\frac{15.4 + 20}{2}\right].(80\text{-}25)$$

$= 186$ W/m

$Q = K\Delta T$

Equation (1) can be simplified for standard pipe dimensions to:

Where K is a conductivity of CPVC and the pipe geometry in the previous example. do = 20mm, and e = 2.3mm

$$Q = \frac{0.14}{2.3}\,3.1416\left[\frac{15.4 + 20}{2}\right]. = 3.38\ (W/m)$$

HANDLING

The pipe should be handled with reasonable care because thermoplastic pipe is much lighter in weight than 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 fork lift. 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.

STORAGE

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 built-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 temperature below freezing.

PRODUCT

RANGE

CPVC PRO PIPE & FITTINGS
CTS - COPPER TUBE SIZE
AS PER ASTM D2846

IS:15778

Only those products bearing the above marks are certified

PIPE SDR-11 (3 MTR. LENGTH)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M511110301	100
2.0	¾	M511110302	50
2.5	1	M511110303	30
3.2	1¼	M511110304	20
4.0	1½	M511110305	15
5.0	2	M511110306	08

PIPE SDR -13.5 (3 MTR. LENGTH)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M511130301	100
2.0	¾	M511130302	50
2.5	1	M511130303	30
3.2	1¼	M511130304	20
4.0	1½	M511130305	15
5.0	2	M511130306	08

PIPE SDR-11 (5 MTR. LENGTH)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M511110501	60
2.0	¾	M511110502	40
2.5	1	M511110503	25
3.2	1¼	M511110504	15
4.0	1½	M511110505	10
5.0	2	M511110506	06

PIPE SDR -13.5 (5 MTR. LENGTH)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M511130501	60
2.0	¾	M511130502	40
2.5	1	M511130503	25
3.2	1¼	M511130504	15
4.0	1½	M511130505	10
5.0	2	M511130506	06

CPVC PRO PIPE & FITTINGS
IPS - IRON PIPE SIZE AS PER ASTM F441

PIPE SCHEDULE 40 (3 MTR. LENGTH)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M511400307	05
8.0	3	M511400308	03
10.0	4	M511400309	02
15.0	6	M511400310	01

PIPE SCHEDULE 80 (3 MTR. LENGTH)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M511800307	05
8.0	3	M511800308	03
10.0	4	M511800309	02
15.0	6	M511800310	01
20.0	8	M511800311	01

10" and 12" pipe sizes are available on request

PIPE SCHEDULE 40 (5 MTR. LENGTH)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M511400507	05
8.0	3	M511400508	03
10.0	4	M511400509	02
15.0	6	M511400510	01

PIPE SCHEDULE 80 (5 MTR. LENGTH)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M511800507	05
8.0	3	M511800508	03
10.0	4	M511800509	02
15.0	6	M511800510	01
20.0	8	M511800511	01

10" and 12" pipe sizes are available on request

CPVC PRO PIPE & FITTINGS
CTS - AS PER ASTM D2846

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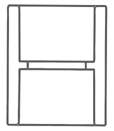
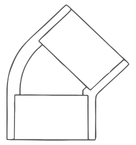
COUPLER-SOC



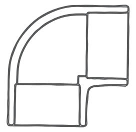
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512111001	1500
2.0	¾	M512111002	600
2.5	1	M512111003	600
3.2	1¼	M512111004	300
4.0	1½	M512111005	200
5.0	2	M512111006	50

ELBOW 45°-SOC



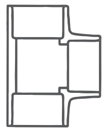
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512112301	500
2.0	¾	M512112302	200
2.5	1	M512112303	250
3.2	1¼	M512112304	60
4.0	1½	M512112305	40
5.0	2	M512112306	15

ELBOW 90°-SOC



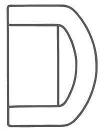
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512110501	1000
2.0	¾	M512110502	800
2.5	1	M512110503	400
3.2	1¼	M512110504	200
4.0	1½	M512110505	120
5.0	2	M512110506	50

TEE-SOC



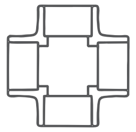
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512110101	800
2.0	¾	M512110102	500
2.5	1	M512110103	300
3.2	1¼	M512110104	150
4.0	1½	M512110105	90
5.0	2	M512110106	40

END CAP-SOC



Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512114101	1000
2.0	¾	M512114102	500
2.5	1	M512114103	200
3.2	1¼	M512114104	120
4.0	1½	M512114105	100
5.0	2	M512114106	40

CROSS-SOC



Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512112401	200
2.0	¾	M512112402	100
2.5	1	M512112403	100

Note: SOC - SOCKET

CPVC PRO PIPE & FITTINGS
CTS - AS PER ASTM D2846

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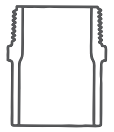
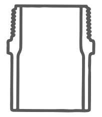


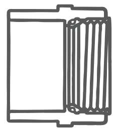
MALE ADAPTOR (CPVC THREADS)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512111301	600
2.0	¾	M512111302	600
2.5	1	M512111303	300
3.2	1¼	M512111304	200
4.0	1½	M512111305	100
5.0	2	M512111306	50



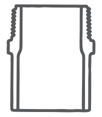
REDUCER MALE ADAPTOR (CPVC THREADS)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 x 1.5	¾ x ½	M512111314	500
2.5 x 2.0	1 x ¾	M512111316	450



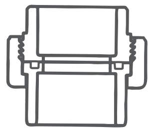
FEMALE ADAPTOR (CPVC THREADS)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512111601	800
2.0	¾	M512111602	500
2.5	1	M512111603	250
3.2	1¼	M512111604	150
4.0	1½	M512111605	100
5.0	2	M512111606	50



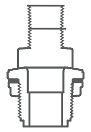
REDUCER FEMALE ADAPTOR (CPVC THREADS)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 x 1.5	¾ x ½	M512111614	600



UNION-SOC

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512112601	210
2.0	¾	M512112602	180
2.5	1	M512112603	120
3.2	1¼	M512112604	90
4.0	1½	M512112605	60
5.0	2	M512112606	30

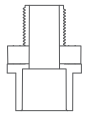


TANK ADAPTOR (THDxTHD)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512112501	80
2.0	¾	M512112502	60
2.5	1	M512112503	40
3.2	1¼	M512112504	30
4.0	1½	M512112505	20
5.0	2	M512112506	15

Note: SOC - SOCKET, THD - THREADED

* Reducer fittings are professionally assembled using ASTRAL fittings and bushings. Quantity as per order.
Note: Fabricated reducer fittings are not eligible for return to the manufacturer. SOC - SOCKET, SPG - SPIGOT, THD - THREADED
All the items where product code starts with "A" are assembled items.

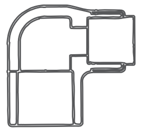


TANK ADAPTOR (SOCKET TYPE) (THDxSOC)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0	¾	M5128010202	75
2.5	1	M5128010203	60
3.2	1¼	M5128010204	70
4.0	1½	M5128010205	60
5.0	2	M5128010206	35

TANK ADAPTOR (SPIGOT TYPE) (THDxSPG)

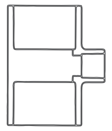
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512806501	200
2.0	¾	M512806502	140
2.5	1	M512806503	80
3.2	1¼	M512806504	40
4.0	1½	M512806505	30
5.0	2	M512806506	20



REDUCER ELBOW 90°-SOC

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 x 1.5	¾ x ½	M512110614	500
2.5 x 1.5	1 x ½	M512110615	350
2.5 x 2.0	1 x ¾	M512110616	300
3.2 x 1.5	1¼ x ½	A512110617*	As Req.
3.2 x 2.0	1¼ x ¾	M512110618	175
3.2 x 2.5	1¼ x 1	M512110619	150
5.0 x 2.5	2 x 1	A512110626*	As Req.

ASTRAL CPVC PRO



REDUCER TEE -SOC

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5 x 1.5 x 2.0	½ x ½ x ¾	A512110291*	As Req.
2.0 x 1.5 x 2.0	¾ x ½ x ¾	A512110292*	As Req.
2.0 x 1.5 x 1.5	¾ x ½ x ½	A512110293*	As Req.
2.0 x 2.0 x 1.5	¾ x ¾ x ½	M512110214	300
2.5 x 2.5 x 1.5	1 x 1 x ½	M512110215	300
2.5 x 2.5 x 2.0	1 x 1 x ¾	M512110216	75
3.2 x 3.2 x 1.5	1¼ x 1¼ x ½	M512110217	100
3.2 x 3.2 x 2.0	1¼ x 1¼ x ¾	M512110218	120
3.2 x 3.2 x 2.5	1¼ x 1¼ x 1	M512110219	80
4.0 x 4.0 x 1.5	1½ x 1½ x ½	M512110220	70
4.0 x 4.0 x 2.0	1½ x 1½ x ¾	M512110221	60
4.0 x 4.0 x 2.5	1½ x 1½ x 1	M512110222	30
4.0 x 4.0 x 3.2	1½ x 1½ x 1¼	M512110223	60
5.0 x 5.0 x 1.5	2 x 2 x ½	M512110224	30
5.0 x 5.0 x 2.0	2 x 2 x ¾	M512110225	35
5.0 x 5.0 x 2.5	2 x 2 x 1	M512110226	15
5.0 x 5.0 x 3.2	2 x 2 x 1¼	M512110227	30
5.0 x 5.0 x 4.0	2 x 2 x 1½	M512110228	25

REDUCER TEE (IPS X CTS)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5 x 2.5	2½ x 1	A5121110031*	As Req.
6.5 x 5.0	2½ x 2	A5121110034*	As Req.
8.0 x 2.5	3 x 1	A5121110037*	As Req.
8.0 x 5.0	3 x 2	A5121110040*	As Req.
10.0 x 5.0	4 x 2	A5121110047*	As Req.
15.0 x 5.0	6 x 2	A5121110055*	As Req.

CPVC PRO PIPE & FITTINGS
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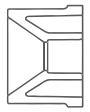
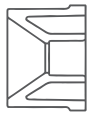
Only those products bearing the above marks are certified

REDUCER BUSHING (SPG x SOC)



Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 x 1.5	¾ x ½	M512111914	1000
2.5 x 1.5	1 x ½	M512111915	600
2.5 x 2.0	1 x ¾	M512111916	800
3.2 x 1.5	1¼ x ½	M512111917	300
3.2 x 2.0	1¼ x ¾	M512111918	300
3.2 x 2.5	1¼ x 1	M512111919	300
4.0 x 1.5	1½ x ½	M512111920	200
4.0 x 2.0	1½ x ¾	M512111921	200
4.0 x 2.5	1½ x 1	M512111922	200
4.0 x 3.2	1½ x 1¼	M512111923	200
5.0 x 1.5	2 x ½	M512111924	100
5.0 x 2.0	2 x ¾	M512111925	150
5.0 x 2.5	2 x 1	M512111926	100
5.0 x 3.2	2 x 1¼	M512111927	100
5.0 x 4.0	2 x 1½	M512111928	100

TRANSITION BUSHING (IPS X CTS)

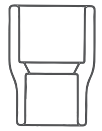


Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5 x 2.5	2½ x 1	A512112131	As Req.
6.5 x 4.0	2½ x 2	A512112133	As Req.
6.5 x 5.0	2½ x 2	M512112134	25
8.0 x 5.0	3 x 2	M512112140	20
10.0 x 5.0	4 X 2	M512112147	10

TRANSITION BUSHING (IPS X CTS)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5 x 1.5	½ x ½	M512112101	1500
2.0 x 2.0	¾ x ¾	M512112102	1000
2.5 x 2.5	1 x 1	M512112103	200
3.2 x 3.2	1¼ x 1¼	M512112104	150
4.0 x 4.0	1½ x 1½	M512112105	80
5.0 x 5.0	2 x 2	M512112106	50

REDUCER COUPLER



Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 x 1.5	¾ x ½	M512111114	1000
2.5 x 1.5	1 x ½	M512111115	500
2.5 x 2.0	1 x ¾	M512111116	450
3.2 x 1.5	1¼ x ½	M512111117	300
3.2 x 2.0	1¼ x ¾	M512111118	300
3.2 x 2.5	1¼ x 1	M512111119	200
4.0 x 1.5	1½ x ½	M512111120	75
4.0 x 2.0	1½ x ¾	M512111121	75
4.0 x 2.5	1½ x 1	M512111122	75
4.0 x 3.2	1½ x 1¼	M512111123	50
5.0 x 1.5	2 x ½	M512111124	40
5.0 x 2.0	2 x ¾	M512111125	90
5.0 x 2.5	2 x 1	M512111126	30
5.0 x 3.2	2 x 1¼	M512111127	30
5.0 x 4.0	2 x 1½	M512111128	70

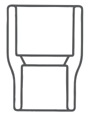
* Reducer fittings are professionally assembled using ASTRAL fittings and bushings. Quantity as per order.
Note: Fabricated reducer fittings are not eligible for return to the manufacturer. SOC - SOCKET, SPG - SPIGOT
All the items where product code starts with "A" are assembled items.

* Reducer fittings are professionally assembled using ASTRAL fittings and bushings. Quantity as per order.
Note: Fabricated reducer fittings are not eligible for return to the manufacturer. SOC - SOCKET
All the items where product code starts with "A" are assembled items. # Shortly introducing

REDUCER COUPLER-SOC

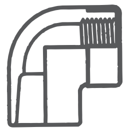
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5 x 4.0	2½ x 1½	A5121110333*	As Req.
6.5 x 5.0	2½ x 2	A5121110334*	As Req.

TRANSITION COUPLER (IPS X CTS)



Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 x 2.0	¾ x ¾	M512112202#	100
2.5 x 2.5	1 x 1	M512112203	200

SSR ELBOW 90°



Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5 x 1.5	½ x ½	M512117501	200
2.0 x 1.5	¾ x ½	M512117514	150

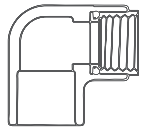
ELBOW 90° 3-WAY

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0	¾	M5121112402	300

ELBOW 90° 4-WAY

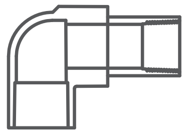
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0	¾	M5121112502	250

BRASS FPT ELBOW 90°



Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5 x 1.5	½ x ½	M512110701	200
2.0 x 1.5	¾ x ½	M512110714	150
2.0 x 2.0	¾ x ¾	M512110702	100
2.5 x 1.5	1 x ½	M512110715	100
2.5 x 2.0	1 x ¾	M512110716	100
2.5 x 2.5	1 x 1	M512110703	50
3.2 x 1.5	1¼ x ½	M512110517	75
3.2 x 2.0	1¼ x ¾	M512110518	60
3.2 x 3.2	1¼ x 1¼	M512110704	30

FEMALE EXT. BRASS ELBOW 90°



Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 x 1.5	¾ x ½	M512114723	100

CPVC PRO PIPE & FITTINGS
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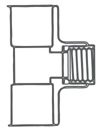
ASTRAL CPVC PRO

MALE BRASS ELBOW 90°

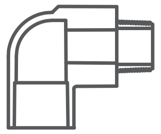
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 x 1.5	¾ x ½	M512114823	100

BRASS FPT TEE

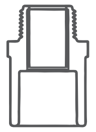
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5 x 1.5 x 1.5	½ x ½ x ½	M512110301	200
2.0 x 2.0 x 1.5	¾ x ¾ x ½	M512110314	100
2.0 x 2.0 x 2.0	¾ x ¾ x ¾	M512110302	100
2.5 x 2.5 x 1.5	1 x 1 x ½	M512110315	75
2.5 x 2.5 x 2.0	1 x 1 x ¾	M512110316	75
2.5 x 2.5 x 2.5	1 x 1 x 1	M512110303	50
3.2 x 3.2 x 3.2	1¼ x 1¼ x 1¼	M512110304	30
3.2 x 3.2 x 1.5	1¼ x 1¼ x ½	M512110317	40

MALE BRASS TEE

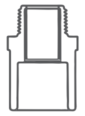
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 x 2.0 x 1.5	¾ x ¾ x ½	M512114923	100
2.5 x 2.5 x 1.5	1 x 1 x ½	M512115024	75

MALE ADAPTOR (BRASS THREADS)

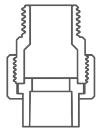
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512111401	200
2.0	¾	M512111402	100
2.5	1	M512111403	50
3.2	1¼	M512111404	25
4.0	1½	M512111405	25
5.0	2	M512111406	15

REDUCER MALE ADAPTOR (BRASS THREADS)

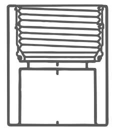
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 x 1.5	¾ x ½	M512111514	150
2.5 x 1.5	1 x ½	M512111515	100
2.5 x 2.0	1 x ¾	M512111416	125

FEMALE ADAPTOR (BRASS THREADS)

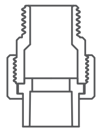
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512111701	200
2.0	¾	M512111702	150
2.5	1	M512111703	50
3.2	1¼	M512111704	35
4.0	1½	M512111705	25
5.0	2	M512111706	15

REDUCER BRASS COUPLER

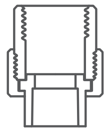
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 x 1.5	¾ x ½	M512111214	200
2.5 x 1.5	1 x ½	M512111215	100
2.5 x 2.0	1 x ¾	M512111216	125

MALE BRASS UNION

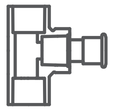
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512119801	200
2.0	¾	M512119802	100
2.5	1	M512119803	60
3.2	1¼	M512119804	35
4.0	1½	M512119805	25
5.0	2	M512119806	15

FEMALE BRASS UNION

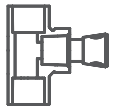
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512119901	200
2.0	¾	M512119902	110
2.5	1	M512119903	70
3.2	1¼	M512119904	35
4.0	1½	M512119905	25
5.0	2	M512119906	15

CONCEALED VALVE (CHROME PLATED) (TRIANGLE)

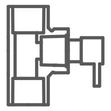
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512118501	01
2.0	¾	M512118502	01
2.5	1	M512118503	01

CONCEALED VALVE (CHROME PLATED) (SQUARE)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M5121110401#	01
2.0	¾	M5121110402#	01
2.5	1	M5121110403#	01

CONCEALED VALVE (CHROME PLATED) (ROUND)

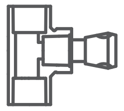



Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M5121110501#	01
2.0	¾	M5121110502	01
2.5	1	M5121110503#	01

Shortly Introducing

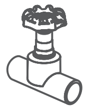
CPVC PRO PIPE & FITTINGS
SPARES FOR CONCEALED VALVE

CONCEALED VALVE (CHROME PLATED) (FLOWER)



Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M5121110601#	01
2.0	¾	M5121110602#	01
2.5	1	M5121110603#	01

CONCEALED VALVE (WHEEL TYPE)



Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512118601	01
2.0	¾	M512118602	01
2.5	1	M512118603#	01

CONCEALED VALVE SWEPT TYPE (CHROME PLATED) (TRIANGLE)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 (Long)	¾	M5121113102#	01
2.5 (Long)	1	M5121113103#	01
2.0 (short)	¾	M5121113202#	01
2.5 (short)	1	M5121113203#	01

CONCEALED VALVE SWEPT TYPE (CHROME PLATED) (SQUARE)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 (Long)	¾	M5121113302#	01
2.5 (Long)	1	M5121113303#	01
2.0 (short)	¾	M5121113402#	01
2.5 (short)	1	M5121113403#	01

CONCEALED VALVE. SWEPT TYPE (CHROME PLATED) (FLOWER)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 (Long)	¾	M5121113502#	01
2.5 (Long)	1	M5121113503#	01
2.0 (short)	¾	M5121113602#	01
2.5 (short)	1	M5121113603#	01

CONCEALED VALVE SWEPT TYPE (CHROME PLATED) (ROUND)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 (Long)	¾	M5121113702#	01
2.5 (Long)	1	M5121113703#	01
2.0 (short)	¾	M5121113802#	01
2.5 (short)	1	M5121113803#	01

Shortly Introducing

All the items where product code starts with "F" are fabricated items.

FANCY HANDLE (KNOB) WITH RED & BLUE PLASTIC BUTTON (TRIANGLE)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0	¾	RM04159009	As Req.

FANCY HANDLE (KNOB) WITH RED & BLUE PLASTIC BUTTON (SQUARE)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0	¾	RM04159006	As Req.

FANCY HANDLE (KNOB) WITH RED & BLUE PLASTIC BUTTON (ROUND)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0	¾	RM04159007	As Req.

FANCY HANDLE (KNOB) WITH RED & BLUE PLASTIC BUTTON (FLOWER)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0	¾	RM04159008	As Req.

S.S. FLANGE WITH RUBBER GROMET

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0	¾	RM04159004	As Req.

BRASS PIPE (C.P)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 (Long)	¾	RM04159005#	As Req.
2.0 (short)	¾	RM04159015#	As Req.

SPINDLE VALVE PART WITH GASKET

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 (Long)	¾	RM04159010#	As Req.
2.0 (short)	¾	RM04159011#	As Req.

VALVE SPINDLE WITH 'O' RING+SHEET METAL LOCK

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0	¾	FA-VAL-E	As Req.

CPVC PRO PIPE & FITTINGS
CTS - AS PER ASTM D2846

Only those products bearing the above marks are certified

VALVE PART WITH GASKET & 'O' RING

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0	¾	FA-VAL-F	As Req.

SPINDLE VALVE PART WITH GASKET

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0	¾	RM04159002	As Req.

CONCEALED CROME PLATED VALVE

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	RM04151012	As Req.
2.0	¾	RM04151034	As Req.
2.5	1	RM04151001	As Req.

VALVE BODY WITH 'O' RING

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0	¾	FA-VAL-D	As Req.

WHEEL TYPE VALVE

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	RM04152012	As Req.
2.0	¾	RM04152034	As Req.

VALVE BODY WITH 'O' RING + VALVE BUSH

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0	¾	WH-VAL-B#	As Req.

VALVE SPINDLE WITH 'O' RING

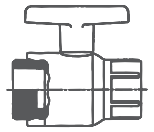
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0	¾	WH-VAL-C#	As Req.

VALVE PART WITH GASKET

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0	¾	WH-VAL-D#	As Req.

Shortly Introducing

BALL VALVES (CTS SOCKETS)



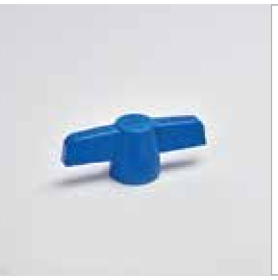
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512112701	80
2.0	¾	M512112702	120
2.5	1	M512112703	50
3.2	1¼	M512112704	40
4.0	1½	M512112705	30
5.0	2	M512112706	15

BALL VALVE LONG HANDLE (CTS SOCKET)

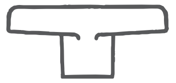
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512112701LH	80
2.0	¾	M512112702LH	100
2.5	1	M512112703LH	50
3.2	1¼	M512112704LH	40
4.0	1½	M512112705LH	30
5.0	2	M512112706LH	15

BALL VALVE LONG HANDLE

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M016118001	As Req.
2.0	¾	M016118002	As Req.
2.5	1	M016118003	As Req.
3.2	1¼	M016118004	As Req.
4.0	1½	M016118005	As Req.
5.0	2	M016118006	As Req.

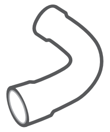


BALL VALVE HANDLE



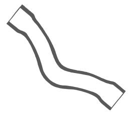
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512118001	As Req.
2.0	¾	M512118002	As Req.
2.5	1	M512118003	As Req.
3.2	1¼	M512118004	As Req.
4.0	1½	M512118005	As Req.
5.0	2	M512118006	As Req.

LONG RADIUS BEND



Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0	¾	M512110902	140
2.5	1	M512110903	80
3.2	1¼	M512110904	50
4.0	1½	M512110905	30
5.0	2	*F512110906	14

STEP OVER BEND



Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M512112801	150
2.0	¾	M512112802	200
2.5	1	M512112803	150
3.2	1¼	*F512112804	30
4.0	1½	*F512112805	20
5.0	2	*F512112806	10

All the items where product code starts with "F" are fabricated items.

CPVC PRO PIPE & FITTINGS
COPPER TUBE SIZE - AS PER ASTM D2846

ALL TOP ADAPTOR (3 IN 1 WALL MIXER ADAPTOR)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 x 1.5	¾ x ½	M512510614	06
2.5 x 1.5	1 x ½	M512510615	06

TOP BOTTOM ADAPTOR (3 IN 1 WALL MIXER ADAPTOR)

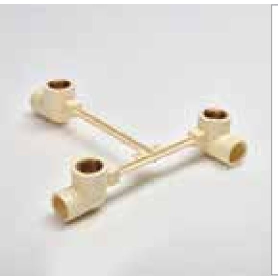
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 x 1.5	¾ x ½	M512510714	06
2.5 x 1.5	1 x ½	M512510715	06

TOP SIDE ADAPTOR (3 IN 1 WALL MIXER ADAPTOR)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 x 1.5	¾ x ½	M512510814	06
2.5 x 1.5	1 x ½	M512510815	06

HOT UP - COLD DOWN ADAPTOR (3 IN 1 WALL MIXER ADAPTOR)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 x 1.5	¾ x ½	M512510914	06
2.5 x 1.5	1 x ½	M512510915	06



HOT SIDE - COLD DOWN ADAPTOR (3 IN 1 WALL MIXER ADAPTOR)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0 x 1.5	¾ x ½	M512511014	06
2.5 x 1.5	1 x ½	M512511015	06

EXTENSION PIECES (CHROME PLATED) (MEDIUM DUTY)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.5	1	T143-010M	As Req.
4.0	1½	T143-015M	As Req.
5.0	2	T143-020M	As Req.
6.5	2½	T143-025M	As Req.
8.0	3	T143-030M	As Req.
10.0	4	T143-040M	As Req.
12.5	5	T143-050M	As Req.
15.0	6	T143-060M	As Req.

EXTENSION PIECES (CHROME PLATED) (HEAVY DUTY)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.5	1	T143-010H	As Req.
4.0	1½	T143-015H	As Req.
5.0	2	T143-020H	As Req.
6.5	2½	T143-025H	As Req.
8.0	3	T143-030H	As Req.
10.0	4	T143-040H	As Req.
12.5	5	T143-050H	As Req.
15.0	6	T143-060H	As Req.

Shortly Introducing

Only those products bearing the above marks are certified

ASTRAL CPVC PRO

END PLUG THREADED

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M214002901	300
2.0	¾	M214002902	200

METAL STRAP

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	T9120M	900
2.0	¾	T9340M	600
2.5	1	T9100M	500
3.2	1¼	T9105M	400
4.0	1½	T9106M	300
5.0	2	T9200M	250

PLASTIC STRAP (PP)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M214006001	1500
2.0	¾	M214006002	2400
2.5	1	M214006003	1600
3.2	1¼	M214006004	900
4.0	1½	M214006005	600
5.0	2	M214006006	400

PLASTIC STRAP (NYLON)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	M214006101	1500
2.0	¾	M214006102	2400
2.5	1	M214006103	1600
3.2	1¼	M214006104	900
4.0	1½	M214006105	600
5.0	2	M214006106	400

ELBOW HOLDER

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5 x 1.5	½ x ½	M214006701	500
2.0 x 1.5	¾ x ½	M214006714	400

TEE HOLDER

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5 x 1.5	½ x ½	M214006801	500
2.0 x 1.5	¾ x ½	M214006814	400

CHAMFERING TOOL

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5 - 3.2	½ - 1¼	M214005600	As Req.

TOOLKIT BOX

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
30.0	12	M144009100	10

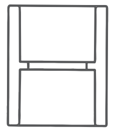
RATCHET CUTTER

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5 - 3.2	½ - 1¼	TTOOL-1	As Req.

CPVC PRO PIPE & FITTINGS
SCH - 40 FITTINGS AS PER ASTM F438

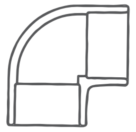
ASTRAL CPVC PRO®

COUPLER - SOC



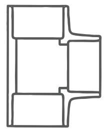
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512401007	20
8.0	3	M512401008	15
10.0	4	M512401009	08

ELBOW 90° - SOC



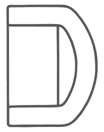
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512400507	15
8.0	3	M512400508	10
10.0	4	M512400509	06

TEE - SOC



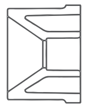
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512400107	12
8.0	3	M512400108	08
10.0	4	M512400109	04

END CAP - SOC



Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512404107	10
8.0	3	M512404108	10
10.0	4	M512404109	10

REDUCER BUSHING (SPGXSOC)



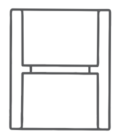
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5 x 2.5	2½ x 1	A512401931	As Req.
6.5 x 3.2	2½ x 1¼	M512401932	25
6.5 x 4.0	2½ x 1½	M512401933	25
6.5 x 5.0	2½ x 2	M512401934	25
8.0 x 2.5	3 x 1	A512401937	As Req.
8.0 x 4.0	3 x 1½	M512401939	20
8.0 x 5.0	3 x 2	M512401940	20
8.0 x 6.5	3 x 2½	M512401941	20
10.0 x 5.0	4 x 2	M512401947	10
10.0 x 6.5	4 x 2½	M512401948	10
10.0 x 8.0	4 x 3	M512401949	10

Note: Fabricated reducer fittings are not eligible for return to the manufacturer. SOC-SOCKET, SPG - SPIGOT
All the items where product code starts with "A" are assembled items.

Only those products bearing the above marks are certified

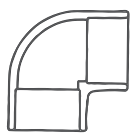
CPVC PRO PIPE & FITTINGS
SCH 80 FITTINGS AS PER ASTM F439

COUPLER - SOC

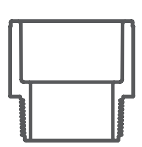
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512801007	20
8.0	3	M512801008	15
10.0	4	M512801009	12
15.0	6	M512801010	02
20.0	8	M512801011	01
25.0	10	M512801012	01
30.0	12	M512801013#	01

ELBOW 90° - SOC

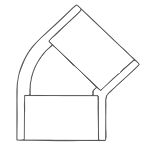
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512800507	15
8.0	3	M512800508	10
10.0	4	M512800509	05
15.0	6	M512800510	02
20.0	8	M512800511	01

MALE ADAPTOR (CPVC THREADS)

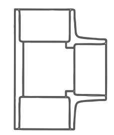
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512801307	30
8.0	3	M512801308	20
10.0	4	M512801309	15

ELBOW 45° - SOC

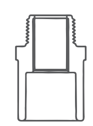
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512802307	20
8.0	3	M512802308	12
10.0	4	M512802309	06
15.0	6	M512802310	02

TEE - SOC

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512800107	12
8.0	3	M512800108	07
10.0	4	M512800109	04
15.0	6	M512800110	02
20.0	8	M512800111#	01

MALE ADAPTOR (BRASS THREADS)

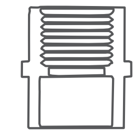
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512801407	09
8.0	3	M512111408	08

Shortly Introducing. SOC - SOCKET

Sizes above 6" will be in Grey colour
* Reducer fittings are professionally assembled using ASTRAL fittings and bushings. Quantity as per order.
Note: Fabricated reducer fittings are not eligible for return to the manufacturer. SOC - SOCKET
All the items where product code starts with "A" are assembled items. All the items where product code starts with "F" are fabricated items.

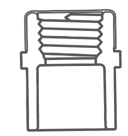
NSF
Only those products bearing the above marks are certified

FEMALE ADAPTOR (CPVC THREADS)

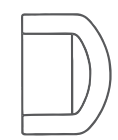
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512801607	30
8.0	3	M512801608	20
10.0	4	M512801609	12

FEMALE ADAPTOR (BRASS THREADS)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512801707	09
8.0	3	M512801708	07

END CAP - SOC

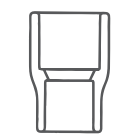
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512804107	55
8.0	3	M512804108	39
10.0	4	M512804109	18
15.0	6	M512804110	06

ASTRAL CPVC PRO®

TANK ADAPTOR (LONG)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	*F512806507	15
8.0	3	*F512806508	09

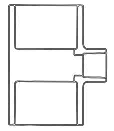
REDUCER COUPLER - SOC

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5 x3.2	2½ x 1¼	M512801132	48
6.5 x4.0	2½ x 1½	M512801133	40
6.5 x 5.0	2½ x 2	M512801134	40
8.0 x 4.0	3 x 1½	M512801139	27
8.0 x 5.0	3 x 2	M512801140	25
8.0 x 6.5	3 x 2½	M512801141	25
10.0 x 4.0	4 x 1½	M512801146	16
10.0 x 5.0	4 x 2	M512801147	16
10.0 x 6.5	4 x 2½	M512801148	15
10.0 x 8.0	4 x 3	M512801149	15
15.0 x 5.0	6 x 2	A512801155*	As Req.
15.0 x 6.5	6 x 2½	A512801156*	As Req.
15.0 X 8.0	6 X 3	A512801157*	As Req.
15.0 X 10.0	6 X 4	A512801158*	As Req.

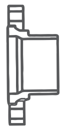
CPVC PRO PIPE & FITTINGS
SCH - 80 FITTINGS AS PER ASTM F439

REDUCER TEE - SOC

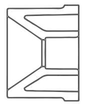
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5 x 2.5	2½ x 1	M512800231	15
6.5 x 3.2	2½ x 1¼	M512800232	15
6.5 x 4.0	2½ x 1½	M512800233	15
6.5 x 5.0	2½ x 2	M512800234	12
8.0 x 2.5	3 x 1	M512800237	10
8.0 x 3.2	3 x 1¼	M512800238#	10
8.0 x 4.0	3 x 1½	M512800239	10
8.0 x 5.0	3 x 2	M512800240	09
8.0 x 6.5	3 x 2½	M512800241	09
10.0 x 2.5	4 x 1	M512800244	05
10.0 x 3.2	4 x 1¼	M512800245	05
10.0 x 4.0	4 x 1½	M512800246	05
10.0 x 5.0	4 x 2	M512800247	05
10.0 x 6.5	4 x 2½	M512800248	05
10.0 x 8.0	4 x 3	M512800249	05
15.0 x 5.0	6 x 2	A512800255	As Req.
15.0 x 8.0	6 x 3	M512800257	02
15.0 x 10.0	6 x 4	M512800258	02
20.0 x 15.0	8 x 6	A512800268#	As Req.

VANSTONE FLANGE SPIGOT

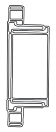
Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512803307	12
8.0	3	M512803308	10
10.0	4	M512803309	06

REDUCER BUSHING (SPGXSOC)

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5 x 3.2	2½ x 1¼	M512801932	50
6.5 x 4.0	2½ x 1½	M512801933	50
6.5 x 5.0	2½ x 2	M512801934	50
8.0 x 4.0	3 x 1½	M512801939	35
8.0 x 5.0	3 x 2	M512801940	35
8.0 x 6.5	3 x 2½	M512801941	35
10.0 x 5.0	4 x 2	M512801947	20
10.0 x 6.5	4 x 2½	M512801948	10
10.0 x 8.0	4 x 3	M512801949	20
15.0 x 10.0	6 x 4	M512801958	06
20.0 x 15.0	8 x 6	M512801968	03

VANSTONE FLANGE - SOC

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512803407	15
8.0	3	M512803408	12
10.0	4	M512803409	08
15.0	6	M512803410	03
20.0	8	M512803411	01

BLIND FLANGE


Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
8.0	3	M512803108	20
10.0	4	M512803109	12

All the items where product code starts with "A" are assembled items. SOC -SOCKET, SPG - SPIGOT
Shortly Introducing

Note: SOC -SOCKET, SPG - SPIGOT

Only those products bearing the above marks are certified

FLANGE - SOC (ONE PIECE)


Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
8.0	3	M512803208	12
10.0	4	M512803209	08

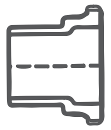
FLANGE RING - SOC


Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512804207	As Req.
8.0	3	M512804208	As Req.
10.0	4	M512804209	As Req.
15.0	6	M512804210	As Req.
20.0	8	M512804211	As Req.

FLANGE HUB - SOC

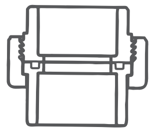

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512803607	As Req.
8.0	3	M512803608	As Req.
10.0	4	M512803609	As Req.
15.0	6	M512803610	As Req.
20.0	8	M512803611	As Req.

FLANGE HUB SPG

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512803707	As Req.
8.0	3	M512803708	As Req.
10.0	4	M512803709	As Req.

UNION - SOC

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	M512802607	15
8.0	3	M512802608	10
10.0	4	M512802609	04

HEX NIPPLE

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
2.0	¾	M5128012702	600
2.5	1	M5128012703	350

CPVC PRO PIPE & FITTINGS
VALVES - TRADING

TRUE UNION IND BALL VALVE SOC EPDM

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	1822-025Cø	As Req.
8.0	3	1822-030Cø	As Req.
10.0	4	1822-040Cø	As Req.
15.0	6	1822-060Cø	As Req.
20.0	8	1822-080Cø	As Req.

TRUE UNION IND BALL CHECK SOC EPDM

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	4522-025Cø	As Req.
8.0	3	4522-030Cø	As Req.
10.0	4	4522-040Cø	As Req.
15.0	6	4522-060Cø	As Req.
20.0	8	4522-080Cø	As Req.

STD. BUTTERFLY VALVE EPDM W/HANDLE

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	722311-025Cø	As Req.
8.0	3	722311-030Cø	As Req.
10.0	4	722311-040Cø	As Req.
15.0	6	722311-060Cø	As Req.
20.0	8	722311-080Cø	As Req.

WAFER BUTTERFLY VALVE VITON W/HANDLE

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
6.5	2½	753311-025Cø	As Req.
8.0	3	753311-030Cø	As Req.
10.0	4	753311-040Cø	As Req.
15.0	6	753311-060Cø	As Req.
20.0	8	753311-080Cø	As Req.

BALL VALVE SPEARS

Size (cm)	Size (inch)	Product Code	Std. Pkg. (Nos.)
1.5	½	1922 - 005	As Req.
2.0	¾	1922 - 007	As Req.
2.5	1	1922 - 010	As Req.
3.2	1¼	1922 - 012	As Req.
4.0	1½	1922 - 015	As Req.
5.0	2	1922 - 020	As Req.

ø Trading Item available in Grey colour only.
Note: SOC -SOCKET

CPVC PRO PIPE & FITTINGS
SOLVENT CEMENTS & PRIMER

Only those products bearing the above marks are certified

IPS WELD-ON 500 CTS ADHESIVE TUBE (YELLOW)

Qty. (ml)	Product Code	Std. Pkg. (Nos.)
22	TTINS-2217	48
44	TTINS-44	24

IPS WELD-ON 500 CTS ADHESIVE SOLUTION (YELLOW)

Qty. (ml)	Product Code	Std. Pkg. (Nos.)
50	CTS-500-50	48
118	CTS-500-118	24
237	CTS-500-237	24
473	CTS-500-473	12
946	CTS-500-946	12

For sizes 65 mm and above use cpvc 724 adhesive solution

RESCUE TAPE

Size (Ft.)	Product Code	Std. Pkg. (Nos.)
5	RSCU-TAPE-05-CLR	120
5	RSCU-TAPE-05-RED	120
5	RSCU-TAPE-05-BLK	120
10	RSCU-TAPE-10-CLR	120
10	RSCU-TAPE-10-RED	120
10	RSCU-TAPE-10-BLK	120
15	RSCU-TAPE-15-CLR	120
15	RSCU-TAPE-15-RED	120
15	RSCU-TAPE-15-BLK	120

IPS WELD-ON PRIMER P 70

Qty. (ml)	Product Code	Std. Pkg. (Nos.)
473	TEZ-221	12
946	TEZ-222	12

N.B. Must use primer for 65 mm (2½") & above

CPVC 724

Qty. (ml)	Product Code	Std. Pkg. (Nos.)
473	TIPS-473	12
946	TIPS-946	12

N.B. For sizes 65 mm (2½") and above

BONDSET FAST SETTING

Qty. (gm)	Product Code	Std. Pkg. (Nos.)
50	BONDSETFS-50	As Req.
100	BONDSETFS-100	As Req.

PTFE TAPE

Size (Mtr.)	Product Code	Std. Pkg. (Nos.)
5	PTFE-1205	As Req.
10	PTFE-1210	As Req.
20	PTFE-1220	As Req.

INSTALLATION PROCEDURE

1. CUTTING

In order 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.

2. DEBURRING/ BEVELING

Burrs and filings 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 entry of the tubing into the fitting socket.

3. 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.

4. 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 water ways.

5. 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 set-up.

6. SET AND CURE

Solvent cement set and cure 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 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.

HOW TO USE SOLVENT CEMENT
PRIMER & CLEANER

JOINT CURING

Recommended initial set times

Temperature Range	Pipe Size ½″ to 1 ¼″ (15 mm to 32 mm)	Pipe Size 1½″ to 3″ (40 mm to 80 mm)	Pipe Size 4″ to 8″ (100 mm to 200 mm)	Pipe Size 10″ to 12″ (250 mm to 300 mm)
15.5°C - 37.7°C	15 min.	30 min.	1 hrs.	2 hrs.
4.4°C - 15.5°C	1 hrs.	2 hrs.	4 hrs.	8 hrs.

Recommended initial cure times

Temperature Range	Pipe Size ½″ to 1 ¼″ (15 mm to 32 mm)	Pipe Size 1½″ to 3″ (40 mm to 80 mm)	Pipe Size 4″ to 8″ (100 mm to 200 mm)	Pipe Size 10″ to 12″ (250 mm to 300 mm)
15.5°C - 37.7°C	6 hrs.	12 hrs.	24 hrs.	48 hrs.
4.4°C - 15.5°C	12 hrs.	24 hrs.	48 hrs.	96 hrs.

CHOOSING SOLVENT CEMENTS & PRIMERS

Solvent cements for ASTRAL CPVC PRO systems must conform to the requirements of ASTM F-493 or equivalent and should carry this identification on the can / tube label. A primer or cleaner must be used. Primers for PVC pipe can be used for CPVC. The National Sanitation Foundation (NSF) mark or other potable water approval should also be located on the container.

Certain code bodies require orange CPVC solvent cement and purple primer to facilitate identification by plumbing inspectors. However, unpigmented (clear) CPVC solvent cement and primer are available and accepted by various jurisdictions. If you decide to use clear products, we strongly recommend contracting the local plumbing inspector prior to beginning a job to determine whether these clear cements and primers are acceptable or not.

CPVC SOLVENT CEMENT'S SHELF LIFE

CPVC solvent cement are formulated to have a Shelf life of two years. Cans are usually marked with manufacturing dates. Good CPVC solvent cement should have the consistency of syrup or honey with no undissolved materials. Aged cement will often change colour or begin to thicken and become gelatinous or jelly-like. When this occurs, the cement must be thrown away.

SOLVENT CEMENT FREEZING

Use the same precautions to protect CPVC solvent cement from freezing as you would with PVC cement. Once cement gels, it can not be recovered and should be discarded.

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 take 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 cements, cleaner, and primers when not in use Evaporation of the solvent will effect the cement.
4. Stir or shake cement before using.
5. Use 20 mm (¾") dauber on small diameter pipes, 40 mm (1½") dauber, upto 80 mm (3") pipe, and a natural bristle brush, swab, or roller having size of ½ the pipe diameter on pipes from 100 mm (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 coloured cements, 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.

IMPORTANT
NOTES

NUMBER OF JOINTS PER LITER OF CEMENT BY PIPE SIZE

Dia of Pipe (mm)	Dia of Pipe (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

* Approximate numbers of joints which can be made per ltr. of solvent cement
* For primer, number of joints are approximate double than solvent cement

SAFE HANDLING OF SOLVENT CEMENT

When using solvent cements, primers and cleaners there are some basic safety measures.

ALL USERS SHOULD KEEP IN MIND.

- Avoid prolonged breathing of solvent vapors. When pipes and fittings are being joined in enclosed area, the use of ventilating devices are advised.
- Keep cements, primers and cleaners away from all the sources of ignition, heat, sparks and open flame.
- Keep containers of cements, 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 & skin contact. In case of eye contact, flush with plenty of water for 15 minutes & 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 insure 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 thread sealant. Some paste sealant can affect CPVC fittings; therefore only sealants recommended for use with CPVC by the thread sealant manufacturer must be used.

GENERAL GUIDELINE FOR ALL INSTALLATIONS

DOS

1. Install product according to ASTRAL's Installation instructions and manual and follow recommended safe work practices.
2. Keep Pipe and Fittings in original packaging until needed and store pipes in covered areas.
3. Use tools designed for use with plastic pipe 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 option. 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 finalise the cut. This step leads to a square cut. In addition, make sure ratchet cutter blades are sharp. Cutting pipe 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 pipe. 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 solvent cement conforming to ASTM F-493 otherwise it may result in joint failure.

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 remove air from the system prior to pressure testing.
6. Rotate the pipe 1/4 to 1/2 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, duct and CPVC should not be located within 50 cm of the duct. For water heaters lacking reliable temperature control, this distance may be increased up to 1 m. 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 duct.
13. 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.

DON'TS

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 Thinner /MTO or any other liquid etc.
5. Do not use air or gases for pressure testings.
6. Do not use any other petroleum or solvent- based sealant, adhesive, lubricant or fire hazard material on CPVC pipes and fittings.
7. Do not use CPVC Pipes & Fittings for pneumatic applications.

ASTRAL POLY TECHNIK LIMITED - Ahmedabad warrants to the original owner that the product will be free from manufacturing defect and confirms to current applicable ASTM standards under normal use. Buyer's remedy for breach of this warranty is limited to replacement of or credit for the defective product. This warranty excludes any expense for removal or reinstallation of any defective product and any other incidental, consequential or punitive damages.
The limited warranty only applicable if ASTRAL CPVC PRO Pipes, Fittings & Weld-on solvent cement are used.

NOTES

ASTRAL® PIPES

A consumer validated **Superbrand in piping** category for **consecutive 3 years**

SELECTED Superbrands INDIA Consumer Validated 2021

India's Most Trusted Pipe Brand based on **TRA's Brand Trust Report for the 3rd time**

TRA's Brand Trust Report - India Study 2020

Power of Trust

Power of Desire

India's Most Desired Brand based on **TRA's Brand Trust Report 2021**

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ISO 9001 CERTIFIED COMPANY By Bureau Veritas (India) Pvt. Ltd.

ASTRAL TOLL FREE 1800 233 7957
Please get in touch with us between 10 AM to 6 PM on Monday to Saturday – except 1st & 3rd Saturday and public holidays

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REV:00/04/19