

# APLAPOLLO Ultima

PVC-O PIPES

The world's **Strongest** PVC pipe



**HAR  
PRESSURE  
SE BEASAR**



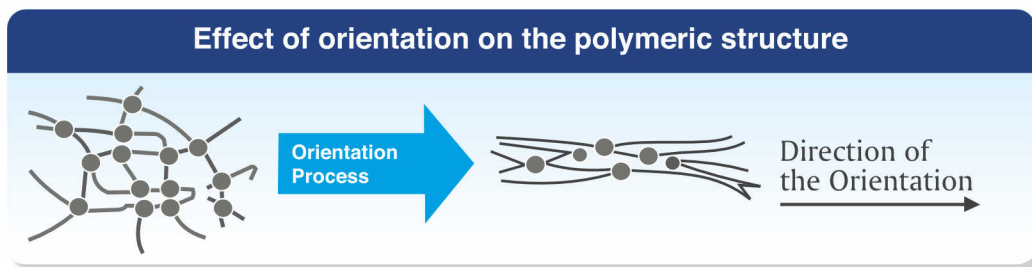
## Overview

The water industry is facing different challenges due to the global calamity. All the stakeholders involved in the production and installation of water pipes are actively seeking cost-effective solutions. The materials of choice for water transportation are plastic and metal pipes. Usually, plastic are used for smaller water systems with pressures up to 16 bars because plastic can be brittle and not resistant to impacts. For bigger water systems with pressures up to 25 bars, ductile iron is used. But, there's a problem with ductile iron—it can get corroded, and that affects how long it will last.

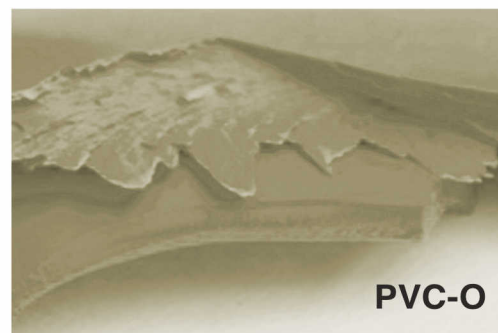
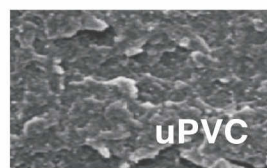
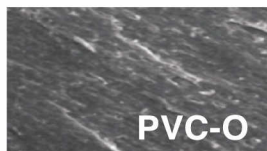
## The PVC-O pipes

Over the last several years, technologies have changed drastically and new technologies have developed to manufacture PVC-O pipes that significantly metamorphosed the old-fashioned mechanical properties of plastic pipes. International standards govern the pressure specifications for PVC-O, allowing for pressure pipe applications up to PIN 25 bars. APL Apollo, a pioneer in plastic pipe manufacturing in India, introduced PVC-O Pipes in 2023. These pipes adhere to the standards outlined in IS 16647:2017 and ISO 16422.

## Revolution in PVC



The molecular orientation process changes the way PVC is put together, making it stronger. PVC is a type of material made up of tiny particles called molecules. Normally, these molecules are all jumbled up randomly. But when we stretch PVC in the right way, the molecules line up in an arranged pattern, making the material even stronger.



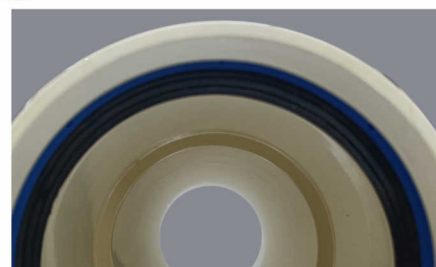
## Outcome: high quality and minimal expenses

The molecular orientation process significantly elevates the physical and mechanical attributes of PVC, preserving the inherent advantages of the polymer. This transformation renders it an unparalleled plastic in terms of strength, impact resistance, and flexibility, all achieved without altering its chemical properties.



## Positioning of Hoop And Axial

The PVC-O class is well-defined by the orientation degree. Better mechanical properties are attained and the orientation degree increases with class level. The hydrostatic strength test over an extended period of time is used to evaluate the class. In the direction of stretching, the orientation is generated. With the help of its technological system, APL Apollo achieves orientation in the hoop and axial directions, reaping complementing advantages. Since axial strains may occur in the socket, axial alignment is especially important. Excellent properties like impact resistance and internal pressure resistance are conferred by the hoop orientation.



## Long-standing Hydrostatic Resistance

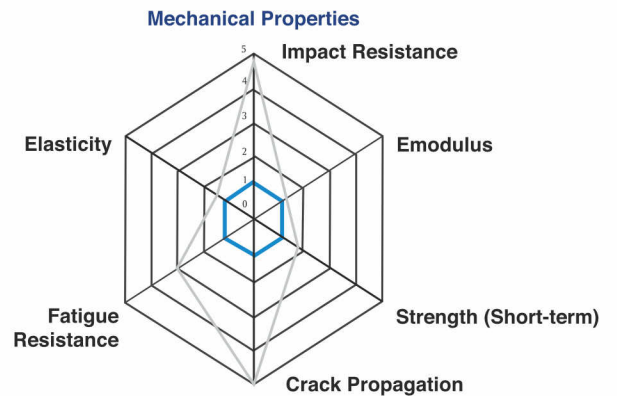
Pipes are exposed to the internal pressure due to the fluid circulation. Better long-term performance is indicated by the fact that PVC-O class 500 exhibits much less creep—a change in material strength over time—than conventional plastics. The International Standard ISO 16422 and IS 16647 recognize PVC-O class 500 as the highest class that indicates the best mechanical qualities.

## Superb Short-term Work

Compared to other plastics, PVC-O class 500 pipes have a stress-strain curve that is quite different and approaches the curve of metals. PVC-O's mechanical qualities get better when the so-called "creep valley" goes away. Only class 500, the maximum degree of orientation, may produce this phenomenon.

## Mechanical properties

Technical characteristics Without changing the chemical properties, molecular orientation significantly improves the mechanical characteristics of PVC-O pipe, giving it much more resilient and flexible impact resistance, no fracture propagation, and fatigue resistance, among other qualities.



## Indomitable Impact Resistance

PVC-O class 500 pipes are strong enough and remain unaffected by regular impacts. The likelihood of bursting during installation due to stone dropping or impact is minimal. The molecular orientation process establishes a layered structure that provides protection against crack propagation and scratches.

## Resistant to the advancement of cracks

The key feature preventing crack propagation along the thickness of the pipe wall is the layered structure achieved through the Molecular Orientation process. During installation, scratches from stones on the site may occur. If cracks form, they progress through the amorphous wall structure. In PVC-O class 500 pipes, these cracks are limited to the initial layers and do not affect the pipe's properties.

## Absence of RCP

It's important to highlight the absence of Rapid Crack Propagation (RCP). Under specific temperature and pressure conditions, RCP can lead to brittle cracks rapidly advancing along the pipe wall in the axial direction at speeds ranging from 100 to 400 meters/second. The energy for this rapid propagation comes from the fluid under pressure within the pipe. PVC-O pipes effectively minimize this phenomenon due to the inherent nature of the material.

## High short and long-term hydrostatic resistance

PVC-O class 500 pipes demonstrate outstanding resistance to short and long-term hydrostatic pressures, enabling them to endure internal pressures up to double the nominal level. This resilience makes them capable of withstanding intermittent pressure surges, including instances like water hammers in the network. The pipes' durability under nominal pressure is assured, due to their enduring low material creep behavior that spans over a century.

## Enhanced Hydraulic Capacity

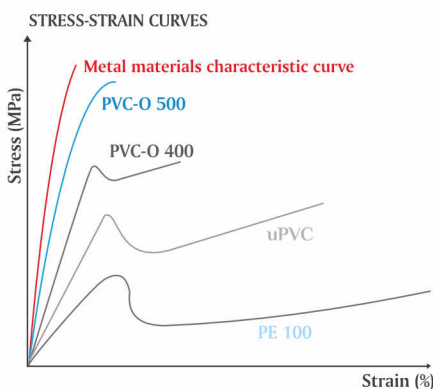
Enhanced hydraulic capacity is achieved with PVC-O class 500 by reducing the wall thickness of the pipe, resulting in a larger internal diameter and flow section. Additionally, the impeccably finished internal surface ensures exceptional smoothness, minimizing load loss and reducing the likelihood of deposits forming on the inner walls. Consequently, PVC-O class 500 pipes provide 15%-40% greater hydraulic capacity compared to pipes of equivalent external dimensions made from other materials such as PVC-U, HDPE, and Ductile Iron.



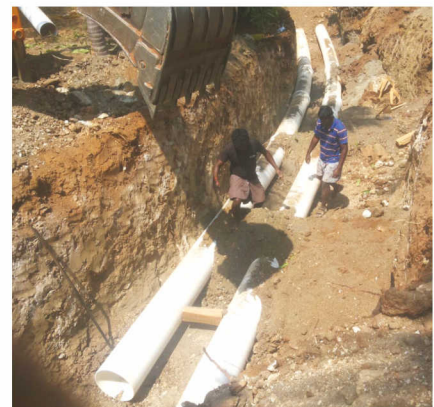
## Supreme Elasticity

PVC-O class 500 pipes have an internal diameter deformation limit of cent percent. Because of their exceptional flexibility, they instantly regain their former shape after being in case of a mechanical mishap, thus removing the possibility of breaking due to soil subsidence.

## Outstanding behaviour in exciting working temperatures



**HOT: up to 45°C,  
COLD: down to -25°C**



Temperature has a significant impact on how well plastics absorb impacts. Plastics can exhibit brittle behaviour below -10°C, making them unsuitable for use in cold climates. Even in the coldest regions, PVC-O class 500 pipe exhibits negligible differences in its ability to absorb shocks.

## Ultraviolet Radiation

On the surface of UPVC and other plastic pipes exposed to sunlight over an extended period of time, UV radiation encourages the formation of microcracks. The thickness of the plastic pipe's wall allows these fissures to spread. They are blocked by the multilayer construction of PVC-O pipes, which keeps them on the outer layer. The pipe's performance is unaffected as a result. Experiments conducted on PVC-O pipes exposed to sunlight for over a year have demonstrated a response comparable to that of non-exposed pipes to ultraviolet radiation.

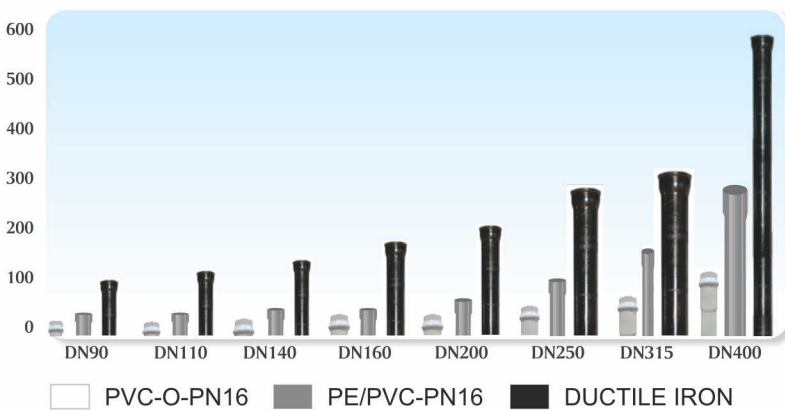
## Resistant to Corrosion

Neither agricultural chemicals nor naturally occurring substances in the soil can cause PVC-O class 500 pipe to corrode. As it is not biodegradable and doesn't require any unique protection saving our cost. Since there is no material deterioration or migration inside the pipes or on their coating, the conveyed fluid's quality is always maintained. Tests that are required demonstrate that the water fulfills the necessary health requirements for human consumption.

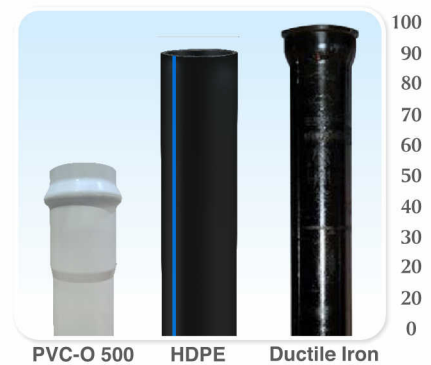
## Lower Installation Cost

Compared to pipes made of other materials, PVC-O 500 pipes are lighter and simpler to handle, and handling them doesn't require any machinery. Installing this type of pipe saves money because it's easier to handle, performs better, and installs faster than other types. They are six to twelve times lighter per meter than ductile iron pipes with the same nominal peripheral diameter.

Weight (in Kg) of six-metre pipe



Estimated Cost Rs/mtr.



## Easy to Handle and Connect

PVC-O 500 pipes are six to twelve times lighter than flexible iron pipes of the same diameter, weighing less than half the typical weight of PVC and HDPE. They can be lifted without the need for mechanical assistance and are simple to handle (for pipes up to DN 315 mm). Because of the PVC-O 500 properties and the design of the pipe, connections between pipes can be made more quickly during installation, negating the need for welded unions. The PVC-O 500 toughness means that impacts scratch less, and the pipes offer numerous benefits for burial and unloading.

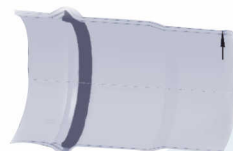
## Watertight Seals and Joints

The most reliable seal for high-pressure drinking water pipes is used in PVC-O pipes. The seal is made up of a synthetic rubber lip and a PP ring that are fitted into the pipe to prevent movement or displacement during installation.

Seal Design and Function



Watertight Anger-Lock Seal



## Accessories

PVC-O pipes are well-suited with all fixtures usable for conventional PVC pipes which are made of either PVC, cast iron, steel or other metallic.

## Materials

- Hoses and T-joints with an elastic joint , Curves, Reducers, • Saddle tapping, with or without load • Repair fixtures • Accessories for traction work

## Fittings

PVC-O 500 pipes are adaptable with all different types of elastic iron fittings like Elbow, Tee, Saddle, and Flange. Tapping saddles are special fittings that allow the pipe to be connected in a different direction to other fittings. These saddles may have screw ends or flange ends. Flanges with an anti-traction system can be used to connect the spigot ends of pipes to fittings with a flange connection. Fittings with plugs euro type are directly connected to the pipe and can be used to change the direction, size and connect different pipes together.

## The best environment-friendly solution for water transportation saving the energy

Expressed energy encompasses non-renewable energy consumption in all the activities related with the pipe's lifecycle. It includes material extraction, manufacturing, installation, and related functions like transport is a key factor. These prime factors determining energy savings are the type of raw material used, the production processes, product quality, and the pipe's lifespan. Opting for raw material-efficient solutions reduces energy usage during extraction and production, while weight reduction facilitates easier and quicker installation and transportation.

In comparison to pipes made from alternative materials and other PVC-O pipe production processes, APL Apollo Technology exhibits lower energy consumption. The inner wall of PVC-O 500 pipes is exceptionally smooth, minimizing pressure loss and significantly reducing the energy needed for fluid transportation over their entire lifecycle. Unlike traditional materials, which may experience a leakage rate of up to 25% and chemical deterioration leading to premature replacements, PVC-O 500 pipes avoid unnecessary energy usage and contribute to a more sustainable water supply network.

Energy consumed by pipes (raw materials+manufacture) (kWh)



## Dimensions

### APL Apollo Ultima PVC-O 500 (C 1.4 Pipe)

Nominal Pressure (bar)		PN12.5	PN16	PN20	PN25	
Nominal Diameter(DN)	Outside Diameter (OD)		Wall Thickness	Wall Thickness	Wall Thickness	Wall Thickness
	min.	max.	mm	mm	mm	mm
mm	mm	mm	mm	mm	mm	mm
90	90	90.3	1.7	2.1	2.6	3.3
110	110	110.4	2.0	2.6	3.2	4.0
125	125	125.4	2.3	2.9	3.6	4.5
140	140	140.5	2.6	3.2	4.0	5.1
160	160	160.5	2.9	3.7	4.6	5.8
180	180	180.6	3.3	4.2	5.2	6.5
200	200	200.6	3.6	4.6	5.7	7.2
225	225	225.7	4.1	5.2	6.4	8.1
250	250	250.8	4.5	5.8	7.2	9.0
280	280	280.9	5.1	6.4	8.0	10.1
315	315	316.0	5.7	7.2	9.0	11.4
355	355	356.1	6.4	8.2	10.1	12.8
400	400	401.2	7.2	9.2	11.4	14.4

### APL Apollo Ultima PVC-O 500 (C 1.6 Pipe)

Nominal Pressure (bar)		PN10	PN12.5	PN16	PN20	PN25
Nominal Diameter(DN)	Outside Diameter (OD)		Wall Thickness	Wall Thickness	Wall Thickness	Wall Thickness
	min.	max.	mm	mm	mm	mm
mm	mm	mm	mm	mm	mm	mm
90	90	90.3	1.5	1.9	2.4	2.9
110	110	110.4	1.8	2.3	2.9	3.6
125	125	125.4	2.1	2.6	3.3	4.0
140	140	140.5	2.3	2.9	3.6	4.5
160	160	160.5	2.6	3.3	4.2	5.1
180	180	180.6	3.0	3.7	4.7	5.8
200	200	200.6	3.3	4.1	5.2	6.4
225	225	225.7	3.7	4.6	5.8	7.2
250	250	250.8	4.1	5.1	6.5	8.0
280	280	280.9	4.6	5.7	7.2	9.0
315	315	316.0	5.1	6.4	8.1	10.1
355	355	356.1	5.8	7.2	9.2	11.4
400	400	401.2	6.5	8.1	10.3	12.8

APL Apollo Ultima PVC-O pipes are supplied in total length of 6 metres.

The inside diameters may be subjected to variation according to manufacturing tolerances.

# ABOUT APOLLO PIPES LIMITED

APL APOLLO has created a name for itself in the last 35 years as a dynamic quality-driven company with a firm eye to the future. It is the vision of the company to provide premium quality products to its consumers at affordable prices, be its pipes & fittings, or bathroom fittings or water tanks. APLAPOLLO has consistently delivered on that promise.

APL APOLLO has a presence in every important sector in the country, such as Plumbing, Sanitation, Water Supply, Infrastructure, Agriculture Oil & Gas, and Construction. It manufactures Piping System and accessories for people who are looking to create beautiful homes at an affordable cost, making it a highly sought-after brand.

With 6 manufacturing plants at Dadri and Sikandrabad (UP), Ahmedabad (Gujarat), Bangalore, (Karnataka) & Raipur (Chhattisgarh) in which we have production capacity of 1,35,000 MTPA\*, APLAPOLLO has created a Pan-India presence.

APL APOLLO has over 1000+ channel partners and over 10,000+ customer touch points. It manufactures a wide range of products and the huge production capacity allows APL APOLLO to simultaneously cater to the smallest, most personal needs of individual customers as well as the retail and distribution needs of retailers, traders, exporters, distributors, etc. Keeping in mind the diversity of needs in the country, all products are developed keeping Indian aesthetics in mind while allowing for the possibility of rough usage, hence APL APOLLO's products are suitable for both the urban and the rural markets. International norms and standards of quality are followed while manufacturing all kinds of plumbing solutions which include but are not limited to CPVC Pipes & Fittings, uPVC Plumbing System, uPVC SWR Piping Systems, uPVC Pressure Pipes & Fittings, Elastomeric (Ring Fit Pipes), PPR-C Plumbing System, uPVC Column Pipe, Well Casing Pipes, HDPE Pipe, HDPE Sprinkler Systems & Cable Ducts, Water Tanks, Garden Pipes and Adhesives. At present, with 2500+ SKUs in its portfolio, APLAPOLLO has the widest range of products available in the Indian market.

APL APOLLO with rich experience in the industry now aiming to provide consumers with Premium Range of Bath Fittings with a commitment to quality and value for money. Tuffplast range of products includes the Faucets series in different style, looks and colours. Adding to the portfolio APL APOLLO also brings you the great range of Hand Showers, Head Showers, Health Faucets. Another new entrant to APL APOLLO Product portfolio is newly launched Premium Tuffplast range of Cisterns and Seat Covers with Light weight, highest quality assurance, easy to handle & add on features like air freshener. All the Products are made keeping Indian aesthetics & rough usage in mind suitable for Urban and Rural applications. APL APOLLO is committed to bring out the products which fulfil all the needs of consumer in all the ways possible, We Offer the range which is Affordable, Durable and Safe.



## APOLLO PIPES LIMITED

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