GANGES GROUP

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INTRODUCTION TO GANGES PIPES

Beneath its cities and fields, homes and industries, there lies a lifeline unseen.

The lifeline carries water, energy, and possibilities to every corner of the earth.

The lifeline is built with precision, innovation, and it is ready to endure the tests of time and the demands of tomorrow.

An addition to this lifeline is here.

OUR MISSION AND VISION

OUR MISSION

To deliver durable, innovative and sustainable pipelines that strengthen the foundation of growth.

OUR VISION

To be the nation’s most trusted lifeline, powering progress through world-class piping solutions.

GANGES GROUP

ABOUT GANGES GROUP

For over a century, **Ganges Group** has been a symbol of trust, innovation, and sustainability evolving with the changing needs of industries and communities. Rooted in natural materials and responsible practices, the group today thrives through four dynamic segments:

Ganges Jute – Leading with eco-friendly solutions and sustainable practices in natural fibres.

Anges – Anges bags, the fashion arm of the Ganges Group, primarily set up to develop a fashion and utility-oriented line of natural and environment-friendly bags catering international clients.

House of Ganges – A fashion-forward arm focused on the domestic market, creating utility-driven, natural, and eco-friendly collections that blend sustainability with everyday style.

Polyhive – A modern packaging solutions brand delivering durable, efficient, and next-generation alternatives.

Together, these pillars reflect the Ganges Group's enduring philosophy of strength, sustainability, and global relevance, creating solutions that are both timeless and future-ready.

OUR JOURNEY THROUGH TIME

1916–1950

GANGES takes root, setting the stage for decades of jute industry leadership.

1950–2002

With over eight decades of expertise in manufacturing and marketing, the company built a diverse portfolio of traditional and modern jute products. Its craftsmanship and knowledge reached over **50 countries**, earning global trust and recognition.

2005

ANGES–an extension of GANGES JUTE, the fashion arm of the Ganges Group, has been dedicated to making natural fibres fashionable.

2006–2014

Recognitions received: Star Export House by the Ministry of Commerce & Industry, Government of India, 2006–2009.

Institutional membership certificate in the Indian Natural Fibre Society.

The largest exporter of Jute Products, 2013 by Textile Conclave 2013 – Brand India.

Top Export Award for Jute Handicraft, 2009–2010.

2012–2016

Polyhive–an extension of GANGES GROUP, is established to focus on specialised packaging for products.

2017–2019

Continues to be the largest exporter of Jute Products and Top Export Award for Jute Handicraft.

2025 onwards

Diversifying into new venture, GANGES introduces its water pipes and solutions division — **GANGES PIPES.**

OVERVIEW OF GANGES O-PVC PIPES

STREAMX

Recently emerging brand dedicated to providing to all your water solutions. With a responsibility beyond installation and a commitment beyond quality, GANGES PIPES serves India's communities and fuels the nation's progress.

A division of Ganges Group, our O-PVC pipes are engineered for durability, sustainability, and top-notch performance across diverse applications.

Material Grades	**MRS 355-500; C=1.4 -1.6**
Size Range	DN 63–1200 (IS 16647); DN 100–600 commercial
Pressure Rating	PN 10 to PN 25 (~1.0–2.5 MPa)
Standards	IS 16647, ISO 16422, ASTM F1483, AWWA C909, AS/NZS 4441

O-PVC (oriented PVC) pipes are produced by stretching regular PVC under biaxial orientation. This process rearranges the polymer chains in a parallel structure, making the material significantly stronger, tougher, and more efficient than standard PVC.

WHY CHOOSE O-PVC PIPES?

Corrosion-free Performance

- O-PVC is immune to corrosion and chemical reactions
- Requires no special coating or protection
- Delivers major cost savings over DI pipes
- Ensures water quality remains intact

Easy Handling & Installation

- O-PVC pipes are lighter and easier to move than DI pipes
- Can be installed manually without heavy machinery
- Saves both time and cost during installation

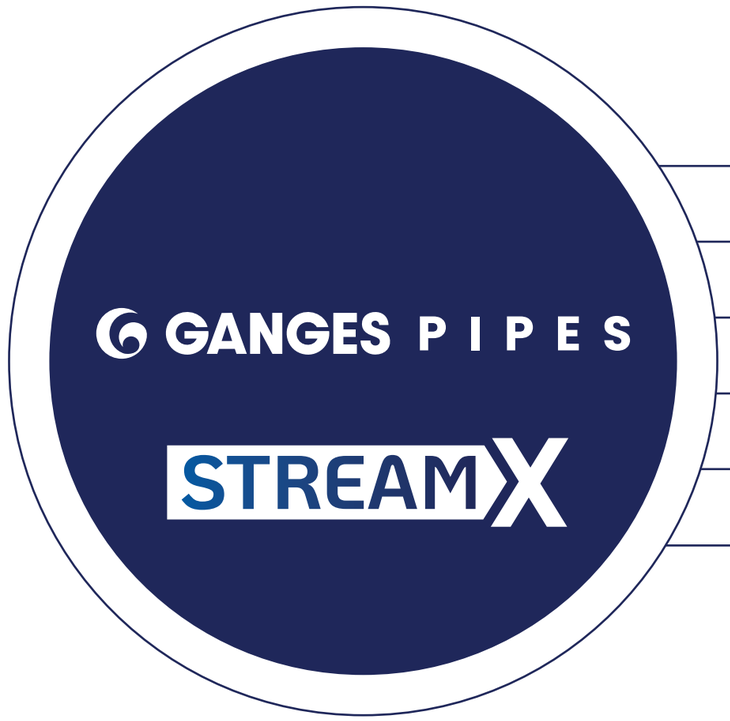
Smooth Flow & High Strength

- O-PVC pipes features an exceptionally smooth inner surface
- Higher C-value (150 vs. 130 for DI) ensures superior flow
- Layered structure provides unmatched impact resistance

High-pressure Ready

- O-PVC Class 500 pipes with homogenous span are ideal for high-pressure pumping in water supply and conveyance

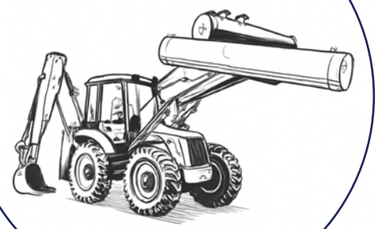
KEY FEATURES OF O-PVC PIPES



- 100% hydro tested pipes
- 100% lead-free & safe
- Restrain rings & joints for hilly/rocky areas
- Leak detection & traceability enabled
- NSF certified elastomeric composite rings
- 100% recyclable sustainable material

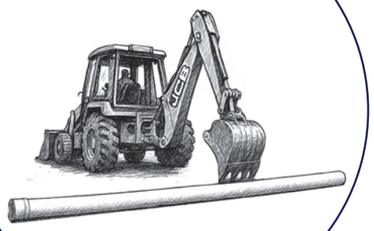
STRENGTH TESTING OF O-PVC PIPES

1



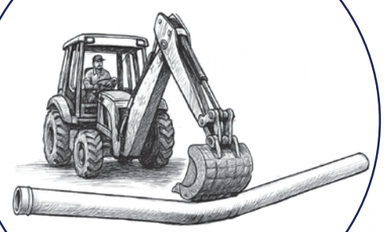
Drop Test (4 meter drop)

2



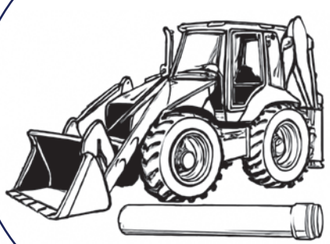
Single Point Notch Test

3



Impact Test

4



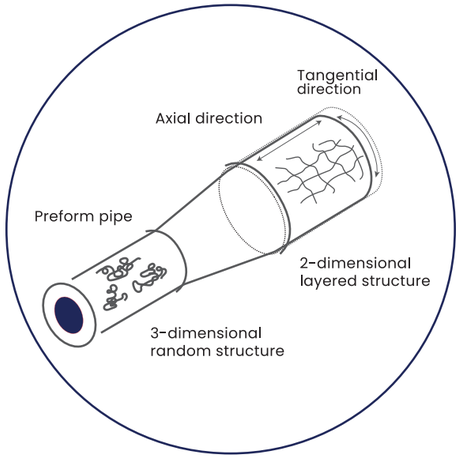
Run Over Test

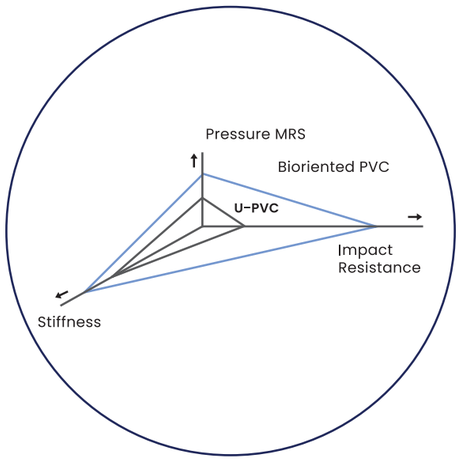
HOW O-PVC PIPES ARE MADE?

Molecular Biaxial Orientation

Molecular biaxial orientation is the process of stretching the pipe walls under controlled temperature, followed by rapid quenching that cools the pipe back to room temperature.

This process aligns molecules in a preferential direction parallel to the surface, creating a quasi-lamellar structure within the pipe walls. The result is a stronger, more durable O-PVC material that delivers superior performance.





Benefits of Biaxial Orientation

- The bi-orientation process gives O-PVC pipes exceptional impact strength and the highest flow capacity
- O-PVC pipes offer higher pressure resistance with minimal effect on water quality
- At the same wall thickness, O-PVC pipes are stiffer than standard uPVC pipes
- The C-value (hydraulic efficiency) remains consistent throughout the service life of O-PVC pipes

APPLICATION OF O-PVC PIPES

O-PVC (Molecularly Oriented Unplasticised Polyvinyl Chloride) is a specialised process that aligns polymer chains to significantly enhance the mechanical properties, surpassing the performance of standard rigid PVC (PVC-U).

- **Superior Strength & Performance**
  O-PVC pipes deliver exceptional strength, enhanced pressure performance, reduced wall thickness and superior hydraulic efficiency, perfect for critical water distribution
- **Potable Water Supply**
  Ideal for high-pressure systems, O-PVC pipes ensure safe, reliable water supply to residential and commercial buildings
- **Irrigation Systems**
  Compliant with food safety regulations, O-PVC pipes provide safe, efficient irrigation for agricultural lands
- **Water Distribution Networks**
  With high strength and corrosion resistance, O-PVC pipes ensure long-lasting, reliable water distribution across India
- **Sewage & Drainage Systems**
  O-PVC pipes enable efficient, hygienic waste disposal, preventing sewage accumulation in drainage networks

Wall thickness & weight of O-PVC PIPE-C=1.4 Vs C=1.6
Dimensions of O-PVC pipes as per IS 16647: 2017

PN 12.5 BAR-CLASS 500 C = 1.4

SIZES	OD		Thickness		
	Min.	Max.	Min.	Max.	Avg.
110	110.0	110.4	2.0	2.5	2.3
160	160.0	160.5	2.9	3.4	3.2
200	200.0	200.6	3.6	4.2	3.9
250	250.0	250.8	4.5	5.2	4.9
315	315.0	316.0	5.7	6.5	6.1
400	400.0	401.2	7.2	8.2	7.7
450	450.0	451.4	8.3	9.4	8.9
500	500.0	501.5	9.2	10.4	9.8
560	560.0	561.7	10.3	11.6	11.0
630	630.0	631.9	11.6	13	12.3

PN 12.5 BAR-CLASS 500 C = 1.6

SIZES	OD		Thickness		
	Min.	Max.	Min.	Max.	Avg.
110	110.0	110.4	2.3	2.8	2.55
160	160.0	160.5	3.3	3.9	3.6
200	200.0	200.6	4.1	4.8	4.45
250	250.0	250.8	5.1	5.9	5.5
315	315.0	316.0	6.4	7.3	6.85
400	400.0	401.2	8.1	9.2	8.85
450	450.0	451.4	9.3	10.5	9.9
500	500.0	501.5	10.4	11.7	11.05
560	560.0	561.7	11.6	13.0	12.3
630	630.0	631.9	13.0	14.6	13.8

PN 16 BAR-CLASS 500 C = 1.4

SIZES	OD		Thickness		
	Min.	Max.	Min.	Max.	Avg.
110	110.0	110.4	2.6	3.1	2.9
160	160.0	160.5	3.7	4.3	4.0
200	200.0	200.6	4.6	5.3	5.0
250	250.0	250.8	5.8	6.4	6.1
315	315.0	316.0	7.2	8.2	7.7
400	400.0	401.2	9.2	10.4	9.8
450	450.0	451.4	10.3	11.6	11.0
500	500.0	501.5	11.4	12.8	12.1
560	560.0	561.7	12.8	14.4	13.6
630	630.0	631.9	14.4	16.1	15.3

PN 16 BAR-CLASS 500 C = 1.6

SIZES	OD		Thickness		
	Min.	Max.	Min.	Max.	Avg.
110	110.0	110.4	2.9	3.4	3.15
160	160.0	160.5	4.2	4.9	4.55
200	200.0	200.6	5.2	6.0	5.6
250	250.0	250.8	6.5	7.4	6.95
315	315.0	316.0	8.1	9.2	8.65
400	400.0	401.2	10.3	11.6	10.95
450	450.0	451.4	11.6	13.0	12.3
500	500.0	501.5	12.9	14.4	13.65
560	560.0	561.7	14.4	16.1	15.25
630	630.0	631.9	16.2	18.1	17.15

PN 20 BAR-CLASS 500 C = 1.4

SIZES	OD		Thickness		
	Min.	Max.	Min.	Max.	Avg.
110	110.0	110.4	3.2	3.8	3.5
160	160.0	160.5	4.6	5.3	5.0
200	200.0	200.6	5.7	6.5	6.1
250	250.0	250.8	7.2	8.2	7.7
315	315.0	316.0	9.0	10.2	9.6
400	400.0	401.2	11.4	12.8	12.1
450	450.0	451.4	12.8	14.3	13.6
500	500.0	501.5	14.2	15.9	15.1
560	560.0	561.7	15.9	17.7	16.8
630	630.0	631.9	17.9	19.9	18.9

PN 20 BAR-CLASS 500 C = 1.6

SIZES	OD		Thickness		
	Min.	Max.	Min.	Max.	Avg.
110	110.0	110.4	3.6	4.2	3.9
160	160.0	160.5	5.1	5.9	5.5
200	200.0	200.6	6.4	7.3	6.9
250	250.0	250.8	8.0	10.1	9.1
315	315.0	316.0	10.1	11.4	10.8
400	400.0	401.2	12.8	14.3	13.6
450	450.0	451.4	14.4	16.1	15.3
500	500.0	501.5	16.0	17.9	17.0
560	560.0	561.7	17.9	19.9	18.9
630	630.0	631.9	20.1	22.4	21.3

PN 25 BAR-CLASS 500 C = 1.4

SIZES	OD		Thickness		
	Min.	Max.	Min.	Max.	Avg.
110	110.0	110.4	4.0	4.7	4.4
160	160.0	160.5	5.8	6.6	6.2
200	200.0	200.6	7.2	8.2	7.7
250	250.0	250.8	9.0	10.2	9.6
315	315.0	316.0	11.4	12.8	12.1
400	400.0	401.2	14.4	16.1	15.3
450	450.0	451.4	16.2	18.1	17.2
500	500.0	501.5	18.0	20.1	19.1
560	560.0	561.7	20.2	22.5	21.4
630	630.0	631.9	22.7	25.2	24.0

PN 25 BAR-CLASS 500 C = 1.6

SIZES	OD		Thickness		
	Min.	Max.	Min.	Max.	Avg.
110	110.0	110.4	4.5	5.2	4.9
160	160.0	160.5	6.5	7.4	7.0
200	200.0	200.6	8.1	9.2	8.7
250	250.0	250.8	10.2	11.5	10.9
315	315.0	316.0	12.8.	14.3	13.9
400	400.0	401.2	16.2	18.1	17.2
450	450.0	451.4	18.2	20.3	19.3
500	500.0	501.5	20.3	22.6	21.5
560	560.0	561.7	22.7	25.2	24.0
630	630.0	631.9	25.5	28.3	26.9

INDUSTRIAL APPLICATIONS OF O-PVC PIPES

Municipal Water Supply

O-PVC pipes are perfect for high-pressure water distribution systems, ensuring safe and reliable water supply to residential and commercial buildings

Agriculture Irrigation

Compliant with food safety regulations, O-PVC pipes provide a safe, efficient solution for irrigation, safeguarding crop water quality

Water Distribution Systems

With superior strength and corrosion resistance, O-PVC pipes are the go-to choice for reliable and long-lasting water distribution networks across Indian cities

Sewage & Drainage Networks

O-PVC pipes ensure efficient waste disposal, preventing sewage build-up and maintaining hygiene within the system

Cable Protection

O-PVC pipes offer durable protection for cables, ensuring their longevity and reducing the risk of damage in various applications

OUR MANUFACTURING FACILITY

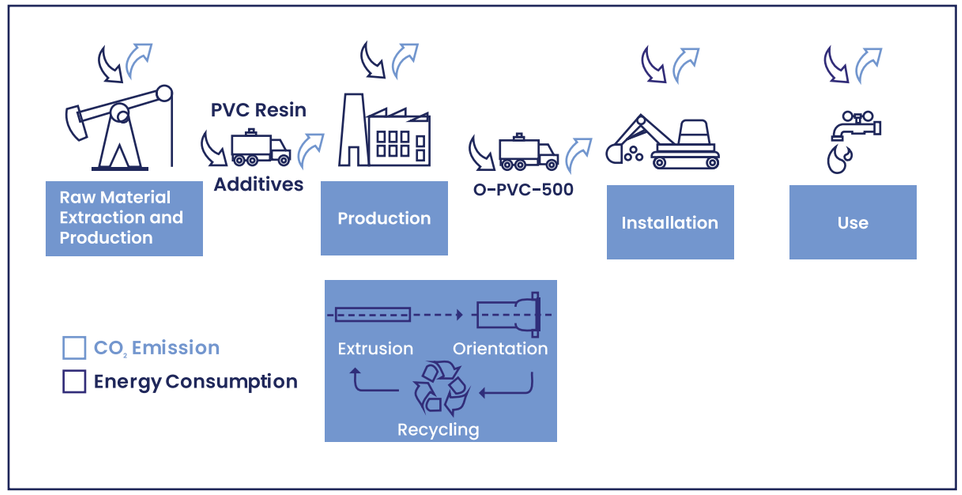
Our **100,000 sq. ft facility in Uluberia** is equipped with cutting-edge technology to produce O-PVC pipes with precision and consistency. Adhering to the highest industry standards, we ensure durable, reliable and sustainable piping solutions.

Designed for municipal water supply, irrigation, sewage networks and more, our pipes are built to endure and deliver exceptional performance year after year.

SUSTAINABILITY BENEFITS OF O-PVC

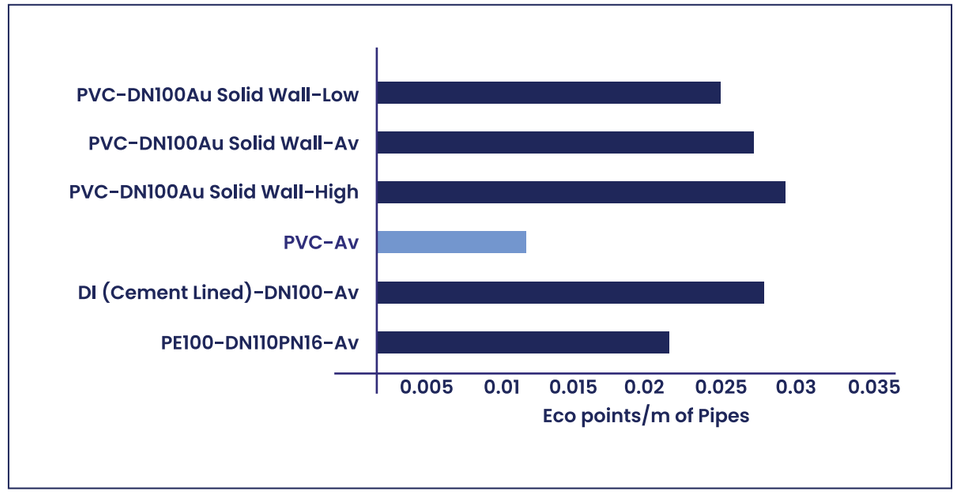
- O-PVC pipes emit significantly less CO_2—up to 80% lower compared to PE100 and UPVC, thanks to their reduced weight and thickness
- Over a 50-year lifecycle, most CO_2 savings are realised during the use phase of O-PVC pipes
- With a larger internal diameter than UPVC at the same external size, O-PVC pipes ensure higher flow efficiency and require lower pumping energy
- Lower pumping energy translates into reduced electricity use and cost savings over time
- A truly green choice that is safe to manufacture, safe to use and safe for carrying precious water supplies

LIFECYCLE OF O-PVC PIPES



O-PVC pipes require lesser pumping energy than HDPE and DI pipes and release less energy resulting in a better environmental impact.

EDGE ENVIRONMENT CHART



Edge environment chart compares the different pressure pipe options on the basis of Eco point ratings, where the higher the rating, the greater the environmental impact.

ECO-SAFE AND DURABLE O-PVC PIPES

Ganges Pipes are designed with the environment at the forefront. Our O-PVC pipes represent a sustainable solution that prioritises **energy conservation**, **sustainable resource use**, and **eco-friendly materials**. Crafted to reduce environmental impact, these pipes are built to last while preserving the planet for future generations.

Air and Atmosphere:

Reducing air pollution and improving atmospheric conditions

Water:

Protecting water resources by reducing water toxicity, eutrophication, and resource depletion

Human Health:

Minimising harmful, respiratory elements, ionizing radiation and cancer-causing agents

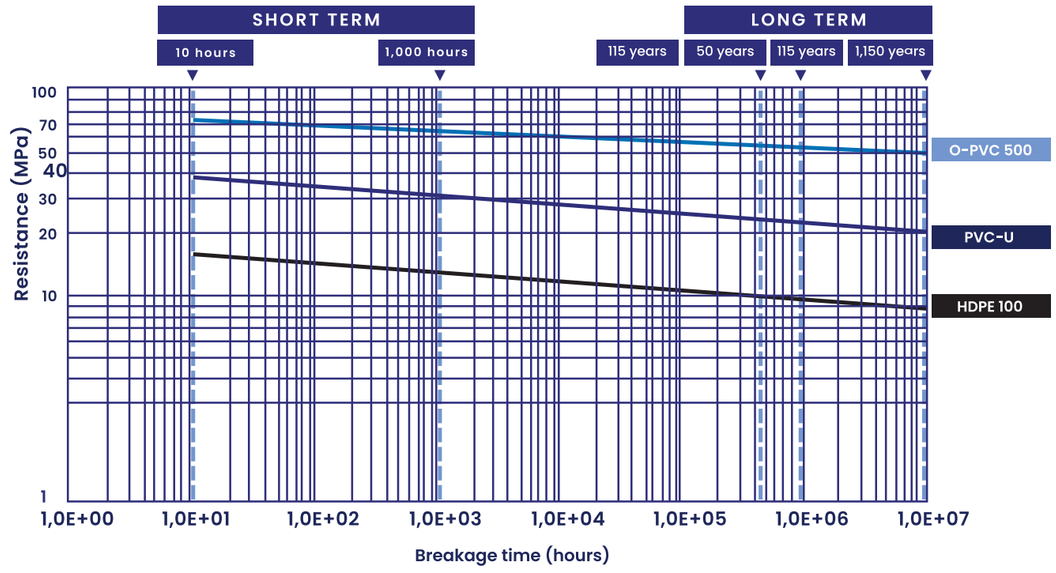
Land Use and Resources:

Reducing mineral depletion, land eutrophication, and optimising land use

Environmental Impacts	Absolute	
Climate change	8.3E+01	kg CO2e
Ozone depletion	5.3E-06	kg CFC-11e
Ecotoxicity – aquatic, fresh water	1.8E+02	CTUe
Human toxicity – cancer effects	4.8iE-06	CTUe
Hauman toxicity - non-cancer effects	8.6E-06	CTUh
Particulate matter / Respiratory inorganics	1.3E-02	kg PM2.5e
Ionising radiation – human health effects	5.3E+00	kg U235e
Photochemical ozone formation	4.1E-01	kg NMVOC
Acidification	4.1E-01	mol H+e
Eutrophication - terrestrial	1.0E+00	mol Ne
Eutrophication – aquatic, fresh water	1.6E-03	kg Pe
Eutrophication – aquatic, sea water	9.5E-02	kg Ne
Resource depletion – water	1.9E-01	m³ SWU
Resource depletion – mineral, fossil	3.8E-03	kg Sbe
Land transformation	1.6E+02	kg Cdef

PROVEN STRENGTH AND LONG-TERM PERFORMANCE

- With higher tensile strength, **O-PVC pipes from Ganges Pipes** deliver superior long-term hydrostatic resistance compared to conventional plastic pressure pipes
- Tests confirm that O-PVC pipes offer significantly better fatigue resistance than UPVC pipes
- Research by the University of Queensland shows O-PVC pipes provide up to **four times the resistance to cyclic fatigue** compared to UPVC
- **Ganges O-PVC Pipes stand for unmatched durability, offering long-term strength and ultra-high fatigue resistance—lasting up to four times longer than conventional UPVC pipes**



MECHANICAL PROPERTIES OF O-PVC PIPES

At Ganges Pipes, we believe the true strength of a pipe lies in the material it's made of. Our O-PVC pipes are engineered with superior mechanical properties that place them a class above conventional options like PVC and HDPE.

The comparison below highlights the technical excellence of Ganges O-PVC pipes, showcasing higher tensile strength, better elasticity, and unmatched resistance to traction ensuring long-term durability and reliability in every application.

		PVC-O 500		PVC	HDPE-100	HDPE-80
Product Standard	Units	IS 16647 UNE-EN 17176	Standard 16422	UNE-EN 1452	UNE-EN 12201	UNE-EN 12201
Minimum Required Strengh (Mrs)	MPa	50.0	-	25.0	10.0	8.0
Overall Service Coefficient (C)	-	1.4	1.4	2.0	1.25	1.25
Design Stress (O)	MPa	36.0	36	12.5	8.0	6.3
Short Term Elasticity Modulus (E)	MPa	4,000	4000	>3,000	1,100	900
Resistance to Uniaxial Traction	MPa	>48	≥48	>45	19	19
Resistance to Hoop Traction	MPa	>85	85	>45	19	19
Shore Hardness D at 20 C	-	81-85	81-85	70-85	60	65

BEYOND MECHANICAL STRENGTH

The following table highlights the non-mechanical properties of **Ganges O-PVC pipes**, showcasing performance features that go beyond strength and durability. These values reflect how Ganges Pipes combines advanced material science with innovation — delivering not just reliability, but an added advantage that sets our pipes apart.

Characteristic	Units	Value
Density	g/cc	1.40-1.46
PVC Resin K value	-	>64
Poisson coefficient	-	0.4
Vicat temperature	°C	>80
Lineal expansion coefficient	°C-1	7.10
Thermal conductivity	Kcal/mh°C	0.14-0.18
Specific heat at 20°C	cal/g°C	0.20-0.28
Dielectric stiffness	kV/mm	20-40
Dielectric constant at 60Hz	-	3.2-3.6
Transverse resistivity at 20°C	Ω/cm	>10
Absolute roughness (ka)	mm	0.007
Absolute roughness (Hazen William)	-	150
Manning roughness coefficient (n)	-	0.009

MATERIAL GRADES & STANDARDS

As per **IS 16647:2017** and **UNE-EN 17176-2:2019**, O-PVC materials are graded by their **Minimum Required Strength (MRS)**, with performance varying across manufacturing processes.
Ganges O-PVC pipes are produced only in the top grade **(O-PVC 500)**, delivering maximum molecular orientation, superior strength, and consistent quality — placing them far ahead of conventional alternatives.

Ganges O-PVC Pipes-O 500 Pipe				
	PN12.5	PN16	PN20	PN25
Material Class	500	500	500	500
MRS (Mpa)	50.0	50.0	50.0	50.0
Nominal Pressure (bar)	12.5	16.0	20.0	25.0
Test pressure over 50 years (bar)	17.5	22.4	28.0	35.0
Test pressure over 10 years (bar)	23.1	28.9	36.7	48.1
Maximum trial pressure onsite (bar)	17.5	21.0	25.0	30.0
Circumferential Stiffiness (KN/m)	≥4	≥4	≥4	≥4

With a temperature of 20°C
According to EN 805:2000 standard with estimated water hammer
Average stiffness per pipe according to established tolerances

PIPE DIMENSIONS AND STANDARDS

Ganges O-PVC Pipes 500 Pipe										
Nominal Pressure (bar)			PN12.5		PN16		PN20		PN25	
Nominal Diameter (DN)	Outside Diameter (OD)		Inside Diameter (ID)	Wall Thickness C1.4(e)	Inside Diameter (ID)	Wall Thickness C1.4(e)	Inside Diameter (ID)	Wall Thickness C1.4(e)	Inside Diameter (ID)	Wall Thickness C1.4(e)
sizes	min.	max.	average	min.	average	min.	average	min.	average	min.
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
110	110.0	110.4	105.8	2.0	104.5	2.6	103.2	3.2	101.6	4.0
160	160.0	160.5	154.0	2.9	152.3	3.7	150.4	4.6	147.9	5.8
200	200.0	200.6	192.5	3.6	190.4	4.6	188.1	5.7	184.9	7.2
250	250.0	250.8	250.8	4.5	238.0	5.8	235.0	7.2	231.3	9.0
315	315.0	316.0	303.3	5.7	300.1	7.2	296.4	9.0	291.3	11.4
400	400.0	401.2	385.2	7.2	381.0	9.2	376.4	11.4	370.1	14.4

Ganges O-PVC pipes are supplied in standard lengths of **6.0 metres,** including the socket length limit mark. The internal diameter may vary slightly, in accordance with manufacturing tolerances specified under **IS 16647:2017**.

HOW O-PVC PIPES CONTROL WATER HAMMER

- Water hammers occur when liquid flow is suddenly stopped or restarted, causing a surge in pressure that may exceed the pipe's working limits
- **Ganges O-PVC pipes** greatly reduce this risk with lower celerity (wave speed) compared to metal or other materials, ensuring safer performance
- The celerity depends on pipe dimensions and material elasticity (Young's modulus, E)

Formula:

$$P = \frac{a.v}{g};\ a = \frac{9900}{\sqrt{43.3 + Ke.\frac{D_m}{g}}};\ Ke = \frac{10^{10}}{E};$$

Where:

- a = wave propagation speed
- v = fluid velocity
- Dm = pipe diameter (mm)
- e = pipe thickness (mm)
- Ke = coefficient linked to modulus of elasticity (E)

STORAGE AND HANDLING GUIDELINES

Transportation:

- Place larger diameter pipes at the bottom when transporting mixed sizes
- Keep socket ends free by alternating sockets and free ends

Storage:

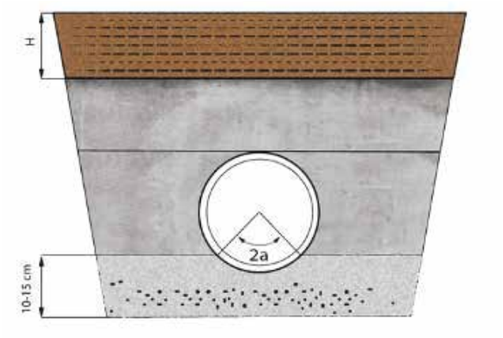
- Avoid dropping or dragging pipes on sharp surfaces; reject pipes with scratches deeper than 10% of wall thickness
- Store pipes horizontally on flat surfaces with supports every 1.5 m to prevent bowing
- Stack pipes in layers with alternate sockets and free ends to avoid load on sockets
- Do not stack higher than 1.5 m to prevent sagging
- When stored outdoors, cover pipes with light-colored opaque material to protect from solar radiation and ensure ventilation to avoid overheating and bowing

TRENCHING AND INSTALLATION REQUIREMENTS

- Trenches should be straight and as narrow as possible, sized according to the load on the pipes
- Maintain a minimum cover of **0.6 m** where there is no road traffic and **1.0 m** under roadways
- Provide uniform support or sand bedding along the full pipe length
- Excavate clearance holes for pipe sockets to ensure even support throughout the line
- After placing the pipe, fill the trench with selected or excavated material, compacted properly without large stones or soil clods
- Avoid direct contact with soil particles larger than **5% of the pipe diameter**
- The quality, density, and compaction of embedment material directly affect pipeline performance
- Remove temporary supports (bricks, timber, etc.) before backfilling
- For joints left uncovered during testing, backfill at least **1.5 × pipe diameter** above the pipe to prevent floating during rain
- The minimum trench width can be calculated as per the following table

DN (mm)	Minimum width of trench (m)
110-250	0.60
315	0.85
355	1.00
400	1.10

Depth of Trench H (m)	Minimum width of trench (m)
H<1.00	0.60
1.00<H<1.75	0.80
1.75<H<4.00	0.90
H>4.00	1.00



PRESSURE JOINT GUIDELINES

Socket jointing of O-PVC pipes for pressure applications

The recommended jointing procedure requires specific overlap lengths based on pipe diameter:

- **110 mm – 2.92%**
- **160 mm – 3.33%**
- **200 mm – 3.75%**
- **250 mm – 4.5%**
- **315 mm – 5.42%**
- **400 mm – 6.25%**

BEST PRACTICES FOR CUTTING AND ASSEMBLY

CUTTING PIPES

- Cut pipes to length with a handsaw or powered disc
- Ends must be clean and square to the axis
- Chamfering cut ends with proper tools
- Remove ~25% wall thickness at **10°–15°**
- Leave **10 mm gap** for thermal expansion; mark insertion depth
- Collect and dispose of cutting chips properly

CLEAN THE SPIGOT & SOCKET

- Remove dust and dirt from spigot and socket
- Check gasket and surrounding housing

APPLY SOAP WATER

- Apply soap water/lubricant up to insertion depth
- Also coat the pipe chamber

ASSEMBLY

- Insert spigot into the socket mouth
- Ensure proper alignment in a straight line before jointing

CORRECT SPIGOT PLACEMENT

- Apply steady force to insert the spigot; for larger pipes, use a crowbar with a wooden block for protection
- Ensure proper insertion to avoid leakage. Under-insertion is when the spigot doesn't reach the depth mark
- Re-exposure of the depth mark after pressurisation (due to Poisson's or thermal effects) is acceptable
- If the spigot reaches the socket barrel transition, it indicates over-insertion and may cause concern
- Avoid uncontrolled insertion using heavy equipment like backhoes or excavators

ON-SITE TESTING PROCEDURES FOR PIPELINE ASSEMBLY

- Perform on-site testing as per local regulations and project standards
- Test installed pipes in sections of 500–1000 metres during assembly
- Close section ends with proper fittings before testing

Nominal Diameter (DN)	Socket Length (SL)	Maximum Diameter (D max)	Length limit mark for the assembly of the pipes (1)		
			PN12.5	PN16	PN20
mm	mm	mm	mm	mm	mm
110	180	140	163	163	163
160	200	197	178	178	178
200	225	243	198	198	198
250	250	301	222	222	222
315	290	374	254	254	254
400	325	472	282	282	282

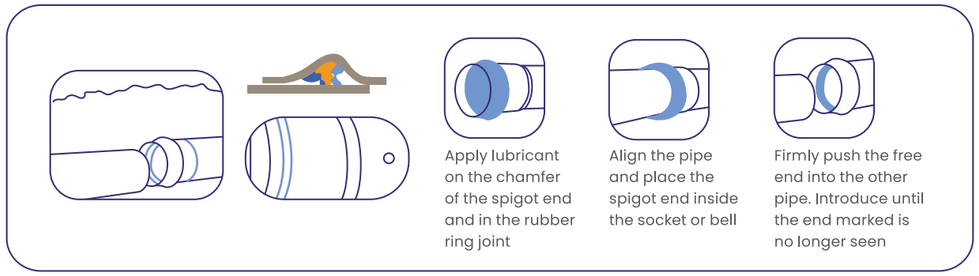
STEP-BY-STEP PROTOCOLS FOR LEAK AND PRESSURE CHECK

Method A:

- Bury the pipe with proper compaction to handle stresses from pressure testing, leaving assemblies uncovered for inspection
- Ensure reductions, changes in direction, joints, and valves are properly anchored
- Perform pressure and leakage tests while observing uncovered unions to spot leaks

Method B:

- Use a shallower anchorage of pipes and fittings, leaving assemblies out for inspection
- Conduct a trial test by filling with water to check for leaks, usually at unions or low-pressure areas
- Repairs are easier with pipes left visible before full anchoring
- Where regulations permit, fittings can be anchored after final compaction, ensuring secure support for high-pressure testing



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