

A Revolution in PVC Toughness & Flexibility

BIONAX™



M U N I C I P A L S Y S T E M S

MOLECULARLY ENHANCED PVC PRESSURE PIPE FOR UNDERGROUND WATER AND SEWER APPLICATIONS

- 4"-12" (100mm-300mm)
CIOD & IPSOD Sizes
- Operating Pressures 235psi CIOD,
160 psi IPSOD


IPEX

We build tough products for tough environments®

BIONAX™

A REVOLUTION IN STRENGTH, TOUGHNESS AND FLEXIBILITY

Imagine a pipe with all the benefits associated with conventional PVC, yet dramatically stronger and more impact resistant.

Introducing Bionax, a molecularly-enhanced PVC pipe designed for water mains, sewage forcemains, irrigation lines and industrial process piping. Made from biaxially-oriented PVC material, Bionax has almost double the strength of conventional PVC and three times the impact absorption capability. While millions of feet of earlier versions of oriented PVC have been installed, Bionax is manufactured using a revolutionary new orientation process, previously unavailable in North America. This ultra high-tech process orients the PVC molecules both in the axial and circumferential directions (biaxial orientation), resulting in a pipe with enhanced toughness and flexibility even when compared to earlier versions of oriented PVC.

Bionax is specially engineered to withstand the rigors of today's installations. With less construction inspection, and less regular maintenance, the market is calling for a pipe that is more robust, stronger and easier to install. Bionax delivers on all three counts.

The First Biaxially-Oriented PVC Pipe for Municipal Applications

Bionax's biaxial orientation dramatically enhances the pipe properties that are important to municipal designers:

- Larger internal diameters increase flow rates and reduce pumping costs
- Higher cyclic fatigue resistance for forcemain and irrigation applications
- Reduced bend radius when compared to standard PVC pipe

Things are not always perfect in the field. Pipe can be impacted by equipment, bedded with sharp stones and boulders, or even pierced by directional drilling equipment. Bionax is designed to withstand even the most violent impact events, and if pierced by a directional drill or "torpedo" type piercing tool, will exhibit only a localized failure. The unique layered material structure that resists impacts also stops cracks before they propagate.



Impact Resistant

With three times the impact strength of regular PVC, Bionax can handle the most punishing storage, handling and construction site conditions.



Tapping Strength

Bionax's unique structural design allows tapping holes to be drilled close together without the risk of splitting or cracking.



Pressure Tough

Bionax's unique molecular reinforcement gives it the ability to withstand extreme internal pressures and deform instead of failing.



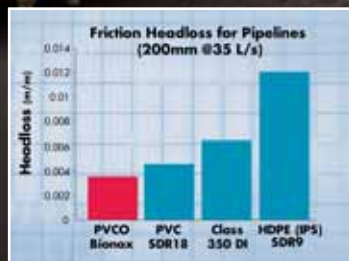
FEATURES & BENEFITS

- ✓ **Circumferential Tensile Strength** – Bionax has almost double the tensile strength of conventional PVC (12,100 psi vs. 7,000 psi). This higher strength results in larger inside diameters, improving the hydraulics of the pipe.
- ✓ **Impact Strength** – Bionax provides triple the impact strength of standard PVC pipe. PVC pipe can withstand extreme jobsite conditions with no damage.
- ✓ **Crack Resistance** – PVC's laminar structure prevents crack propagation, preventing damage to the pipe.
- ✓ **Longitudinal Tensile Strength** – Bionax has higher tensile strength in the axial direction, which allows a tighter bend radius than other materials.
- ✓ **Certification** – Bionax is the most certified product on the market, NSF certified to meet AWWA and ASTM standards.

Although this extreme punishment shows how tough Bionax really is, we do not recommend this type of abuse for any real project – please follow our installation procedures.

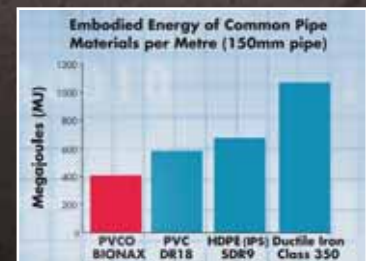
CERTIFIED TOUGH

Every length of Bionax is hydrotested to AWWA standards before being shipped. In fact IPEX is the only manufacturer to have third-party certification (by NSF) to meet the stringent AWWA standards. This rigorous testing means Bionax will work as tough on your job site as it does in our labs.



Excellent Hydraulics

Bionax's smooth inside surface and larger ID means less friction headloss versus other materials. The reduced pumping costs and energy use are good for the environment.



The Green Solution

Bionax has the lowest embodied energy per metre than any other piping material. Taking less energy to manufacture, Bionax has the lowest carbon footprint of any piping product available.



Lightweight & Easier to Handle

40% lighter than conventional PVC, Bionax is safer and easier to carry. This means less equipment is required and installation is fast and efficient. Bionax's increased flexibility means a reduced bending radius that allows it to fit around gradual curves. In fact, Bionax is so light and flexible that several joined lengths can be lifted as a single unit and installed in a trench, further speeding installation.

Reduced Maintenance & Pumping Costs

Bionax's increased strength allows higher inside diameters for the same pressure rating, reducing pumping costs. Bionax's smooth inside surface maintains its excellent hydraulic properties virtually forever with extremely low maintenance costs, saving energy associated with pumping and maintaining its superior flow profile.

Manufacturing Consistency & Quality

Bionax's ultra high-tech manufacturing process ensures that the pipe will meet the toughest standards. In fact, the initial stock pipe must be flawless in order to survive the orientation process – in essence, the process acts as its own quality control. Bionax is 100% I.D. and O.D. controlled, meaning that its tolerances are much tighter than conventional pipe.

Joining Methods

Bionax's standard joining method uses easy-to-assemble gasketed joints. No special training is required to install Bionax as the procedure is virtually identical to standard PVC pipe. In addition, research has shown that Bionax can be successfully solvent cemented for above ground applications. This brings the benefits of a super-impact resistant pipe to an entirely new set of applications.



Integrated Total PVC Solutions

Typical of any IPEX piping system, Bionax offers a totally-integrated solution. The entire end-to-end system integrates seamlessly and is compatible with regular C900 and C907 fittings. When you purchase Bionax, you get everything – all the pipe and fittings – you need to get the job done. And since it comes from IPEX, you also get the peace of mind knowing your system is supplied by a single trusted and accountable source who is guaranteed to stand behind you and your piping system.



APPLICATIONS

Water Mains

Sewage Force Mains

Irrigation Lines

Industrial Process Piping



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MOLECULARLY ENHANCED PVCO PIPE

While biaxial orientation isn't a new process, it's been difficult to produce efficiently and reliably in high volumes. Thanks to a breakthrough in innovative manufacturing, IPEX now uses the most advanced process in the plastics industry to biaxially orient PVC molecules and produce the lightest, strongest pipe available.

In the past, oriented PVC was expanded in a mold, resulting in orientation in only one direction. Now biaxial orientation is achieved by stretching pipe over a mandrel at tightly-controlled temperatures and stress levels. The result is a pipe with dramatically-enhanced properties both in the circumferential direction (increased hoop stress capability) and in the longitudinal direction (higher impacts, point loading and lower bending radius). More importantly, Bionax's manufacturing process consistently maintains these qualities with a continuous process, rather than using older batch processing technology.

While these cutting-edge manufacturing techniques are expensive, they result in the strongest, toughest and most consistent high-quality pipe available on the market today.

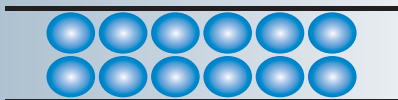


Stretching regular PVC pipe biaxially in both the hoop and axial directions—lengthways and sideways—over a mandrel after the pipe is extruded dramatically improves the performance of PVC material.

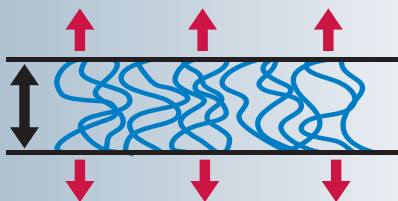
REGULAR PVC



Regular PVC is manufactured in a single layer.



When PVC pipe is extruded in the traditional way, a more or less spherical molecular structure results, requiring thicker walls to provide the necessary strength.

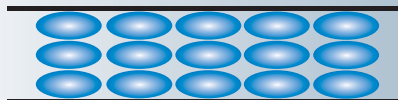


Because they're unaligned, the molecules within regular PVC react to force in a general, haphazard direction.

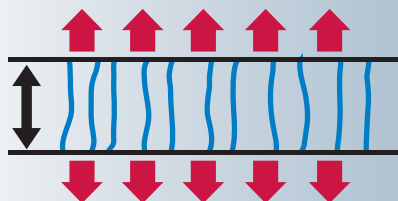
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Due to biaxial molecular orientation during the manufacturing process, thin stratified layers are formed within the PVCO, resulting in higher impact strength even under extreme pressure.



As the PVC is stretched, so are the spherical molecules, allowing more of these elongated molecules to fit into a single layer than regular PVC. This gives the material a higher molecular density and makes it tougher.



Biaxial stretching creates a molecular orientation in which the molecules can be aligned in the direction of the expected load, resulting in superior force resistance.

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CIOD PIPE

Nominal Sizes	4"(100mm)	6"(150mm)	8"(200mm)	10"(250mm)	12"(300mm)
Outside Diameter	4.80"(122mm)	6.90"(175mm)	9.05"(230mm)	11.10"(282mm)	13.20"(335mm)
Pressure Rating	235 psi at 73°F				

Available in 20 ft. lengths



IPSOD PIPE

Nominal Sizes	4"(100mm)	6"(150mm)	8"(200mm)	10"(250mm)	12"(300mm)
Outside Diameter	4.50"(114mm)	6.63"(168mm)	8.63"(219mm)	10.75"(273mm)	12.75"(324mm)
Pressure Rating	160 psi at 73°F				

Available in 20 ft. lengths

Experience Bionax's revolutionary performance on this CD-ROM.

For more information or to be included on our mailing list for new product announcements, complete this card and fax it back to us at (905) 403-1124.

Name	
Title	Dept.
Company	
Address	
City	State/Province
Zip/Postal Code	Phone
Fax	E-mail

Company classification:

- Architect/Design Firm
- Builder/Developer
- Operator/Plant Maintenance
- Contractor
- Distributor/Wholesaler
- Engineering Firm
- Government
- OEM - Product(s) Manufactured: _____
- Utility
- Other: _____

Product interests:

- PVC Pressure Systems
- PVC Sewer Systems
- Irrigation Systems
- Piping Systems for Water and Waste Water Treatment Plants
- Waste Water Treatment Systems
- Sewage Force Mains
- Service Pipe and Compression Fittings

I would like:

- PVC Pressure System Design
- PVC Sewer System Design
- Surge Pressures in PVC
- Installation Guide
- Longevity of PVC
- Hydraulics of PVC Pipe
- How PVC compares to other materials

I would also like to know about other IPEX products:

- Plumbing and mechanical piping systems
- Electrical or telecommunications piping systems
- Irrigation piping systems
- Industrial piping systems



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Toll free: (866) 473-9462

www.ipexinc.com

U.S. Customers call IPEX USA, LLC

Toll free: (800) 463-9572

www.ipexamerica.com

About IPEX

IPEX is a leading supplier of thermoplastic piping systems. We provide our customers with one of the largest and most comprehensive product lines. All IPEX products are backed by over 50 years of experience. With state-of-the-art manufacturing facilities and distribution centers, the IPEX name is synonymous with quality and performance.

Our products and systems have been designed for a broad range of customers and markets. Contact us for information on:

- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- Industrial process piping systems
- Electrical systems
- Telecommunications and utility piping systems
- Irrigation systems
- Industrial, plumbing and electrical cements
- PVC, CPVC, PP, FR-PVDF, ABS, PEX and PE pipe and fittings (1/4" to 48")

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IPEX maintains a policy of ongoing product improvement. This may result in modifications of features and/or specifications without notice.



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