NIRON®

PRESSURE POLYPROPYLENE PP-RCT PIPING FOR CHILLED, HYDRONIC, & H&C POTABLE WATER

F.W. WEBB COMPANY
Thermoplastic Piping Division

NIRON PP-RCT PIPING SYSTEMS

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What is "PP-R"?

- Introduced more than 30 years ago
- PP-R (Polypropylene – Random Copolymer) – one of the many forms of polypropylene
- Reliable, proven material for use in a wide variety of applications
- Most commonly used plumbing piping in the world (increasingly popular in US & Canada)
- High pressure rating & impact resistance

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What is NIRON ?

- Polypropylene piping system used in pressure plumbing, mechanical, and industrial applications
- Manufactured in nominal pipe sizes ½" – 24" (20mm – 630mm OD)
- Niron is NUPI America's trade name for their advanced **PP-RCT** thermoplastic piping systems
- **PP-RCT** stands for **P**oly**p**ropylene - **R**andom **C**rystalline **T**emperature
- "PP-R on steroids"

Molecular Structure

PP-R

- "Jar of marbles"
- Good chemical resistance
- Good strength
- More space between larger "marbles"

VS

PP-RCT

- "Jar of sand"
- Better chemical resistance
- Better strength
- Higher pressure limits
- Greatly reduced space between molecules (more dense structure)

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PP-RCT PIPING SYSTEMS

PP-RCT in brief…

- Up to 48% higher pressure rating, elevated impact resistance, and enhanced Chlorine resistance vs. PP-R
- Excellent chemical resistance, including propylene and ethylene Glycol

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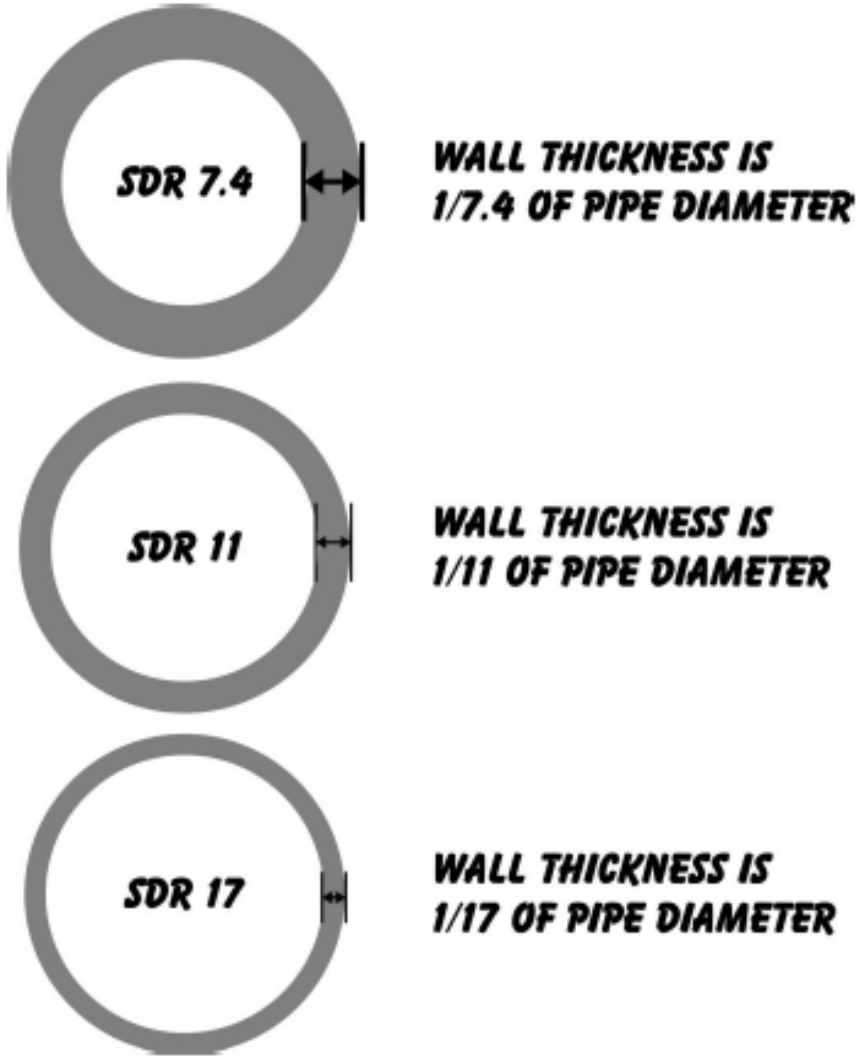
SDR = Standard Dimension Ratio

Higher SDR pipe:

- Thinner wall
- Lower pressure rating
- Lighter weight
- Lower price

NIRON PP-RCT PIPING SYSTEMS



Multiple SDR's allow the designer/installer the ability to choose the best pipe based on the intended operating temperature and pressure of the system

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NIRON Clima

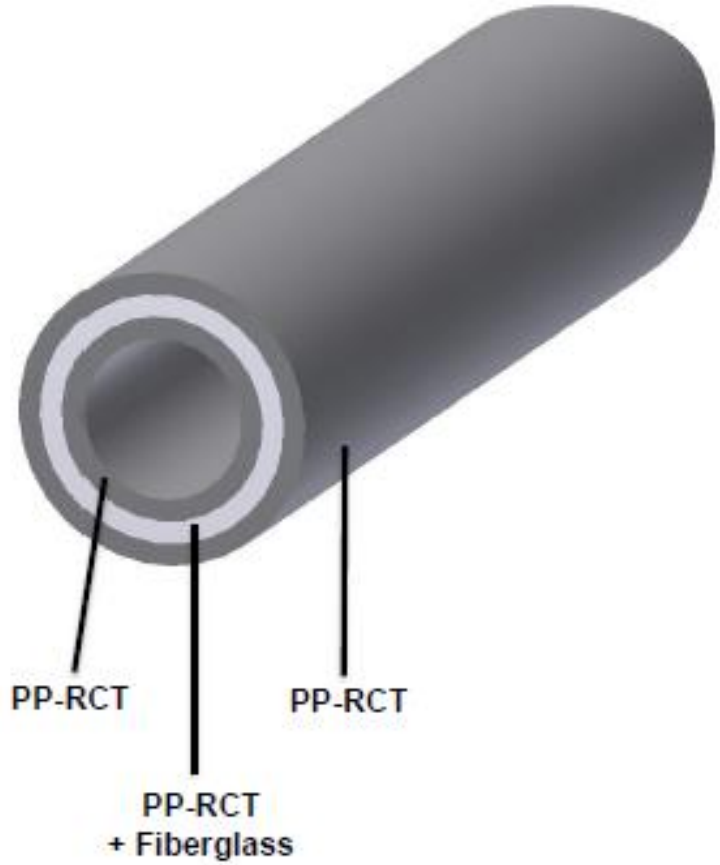
“One pipe fits all”

FIBERGLASS MIDDLE LAYER
COEXTRUDED PIPE

½" - 6" SDR7.3 (up to 423psi)
1" - 16" SDR11 (up to 267psi)
2" - 24" SDR17 (up to 168 psi)
pressures listed at 68°F

20’ LENGTH STANDARD – WITH ABILITY TO RUN CUSTOM LENGTHS

GREY IN COLOR
Hot & Cold HVAC piping
Hot & Cold potable water
Chemical/Process/Compressed Air



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Why would you use nupi AMERICAS NIRON POLYPROPYLENE PIPING SYSTEM ?

- Does not scale, corrode, or erode
- 3 heat fusion joining methods create a molecular bond & allow for versatility during installation
- Lower total installed cost
- Chemically inert material
- Hydrophobic (repels water)
- Expected service life of 100+ years
- Rated for high pressures and temperatures
- Prefabrication friendly
- 30 year / $30 million dollar warranty
- 100% recyclable
- Non-toxic
- No open flame used during installation
- No fire watch or burn permits
- No off gases during fusion
- Poor conductor of energy (less prone to sweating, does not transfer heat like metallic piping)
- Niron Clima is engineered for reduced thermal expansion (75% less than other plastics)
- Light weight for easier job site handling and installation (6” SDR17 = 2.95 lbs/ft VS. 6” Sch40 Steel = 18.99 lbs/ft)

=

Temperature and Pressure Ratings

SUSTAINED PRESSURE RATINGS FOR HVAC AND INDUSTRIAL APPLICATIONS (PSI)

Temp °F	Niron Clima Niron Mono Grey SDR 7.3	Niron Clima Niron Mono Grey SDR 9	Niron Clima Niron Dark Niron Mono Grey SDR 11	Niron Clima Niron Dark Niron Mono Grey SDR 17
	Pressure Rating (psi)			
≤ 50	482	381	303	191
68	418	331	263	165
86	360	286	226	142
104	308	244	193	122
122	261	207	164	103
140	223	177	141	89
158	187	148	118	74
176	158	125	100	62
203	120	96	75	48

SUSTAINED PRESSURE RATINGS FOR POTABLE WATER APPLICATIONS (PSI)

Temp °F	Niron Clima Niron FG RED SDR 7.3	Niron Clima Niron FG RED SDR 9	Niron Clima Niron FG RED Niron Blue / Mono Grey SDR 11	Niron Clima Niron Blue Niron Mono Grey SDR 17
	Pressure Rating (psi)			
68	418	331	263	165
86	360	286	226	142
104	308	244	193	122
122	261	207	164	103
140	223	177	141	89
158	187	148	118	74
176	158	125	100	62
203	120	96	75	48

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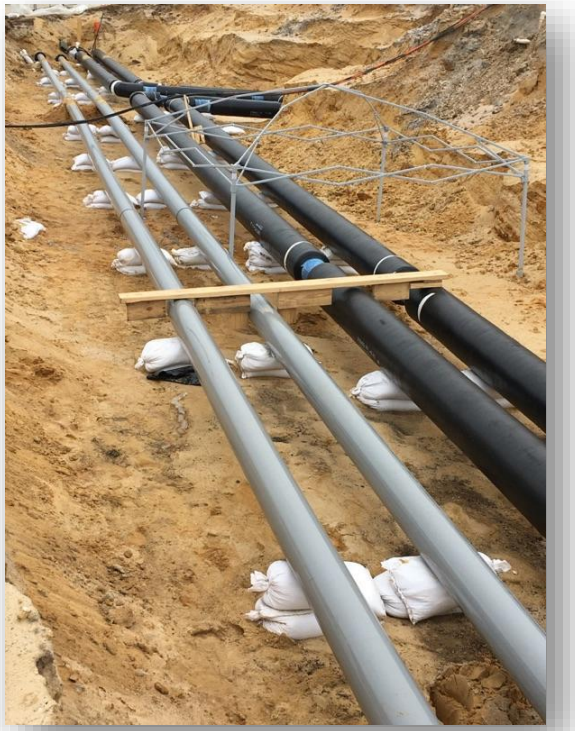
Typical NIRON Applications

- Potable Hot & Cold Water (residential & commercial)
- Cooling Tower/Condenser Water piping
- Chilled Water & Glycol Systems
- Heating Hot Water Systems
- Chemical Transport
- Compressed Air
- Direct Bury



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compared to metal

Documented issues with metal piping material

- Pitting (Copper)
- Erosion/Corrosion (Copper)
- General Corrosion/Rust (Steel/Iron)
- Tuberculation (Steel/Iron)
- Stress Cracking (Steel/Stainless Steel/Copper)
- Scale Build-up (all metals)
- Limitations in Velocity due to Noise (copper)
- Higher total installed cost due to high manual requirements for joining techniques, weight, etc.

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NIRON compared to metal

- **Corrosion & Scale Resistant**
  - Polypropylene is a poor conductor of electricity – which reduces corrosion
  - Smooth inert inner surface resists incrustation of minerals
  - No galvanic corrosion
- **Saves Energy**
  - Pipe doesn't lose flow capability which decreases pump efficiency over time
  - Low heat conductivity of NIRON reduces heat loss / heat gain and insulation needs
- **Reduced Exterior Condensation**
  - Natural insulating properties of NIRON reduces exterior condensation
  - Should condensation occur, NIRON is completely resistant to the corrosive effects of that condensate.

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NIRON compared to metal

- **30-year Warranty**
  - NIRON system under warranty for 30 years from installation
- **Drastically Improved Life Span**
  - NIRON systems tested to 100+ years – typical metal system 5 – 25 year life span (depending on application)
  - The smooth internal surface and inert material of NIRON eliminate scale, erosion and corrosion
- **Reduced Maintenance Costs**
  - Reduced wear on other system components
  - Leak-free joints
  - Lack of component replacement
  - Chemical treatment unnecessary
  - MRO significantly reduced

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NIRON offers

Three Versatile Joining Methods

WIDOS
Welding. Together.

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Socket Fusion

Butt Fusion

Electrofusion

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Socket Fusion

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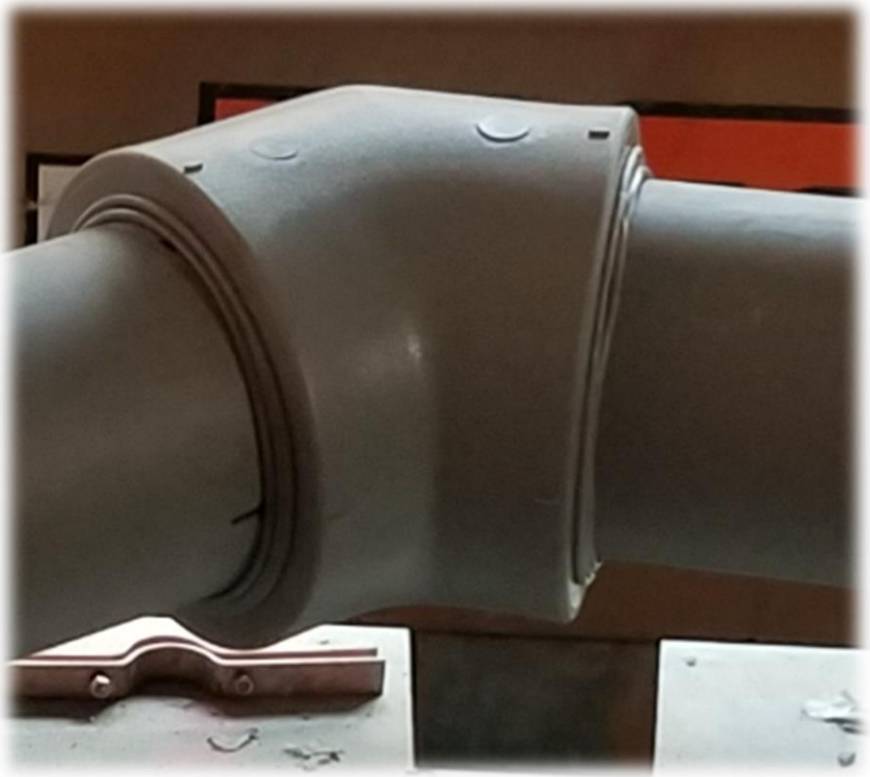
- ½” – 5” (20mm – 125mm OD)
- Outside of pipe and inside of fitting are heated up simultaneously
- Can be done in place (field joints) or in prefabrication
- Once cooled, the result is one homogenous piece

WIDOS
Welding. Together.



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Butt Fusion

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- 2” – 24” (63mm – 630mm OD)
- Pipe ends and/or fittings of equal diameter are heated simultaneously using a flat heat plate
- Once ends are heated for the appropriate amount of time, they are then pushed together and cooled under pressure

- Best used in prefabrication but can also be done in place (field joints)
- Manual and/or hydraulic machines
- Eliminates the need for couplings

WIDOS
Welding. Together.

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Electrofusion

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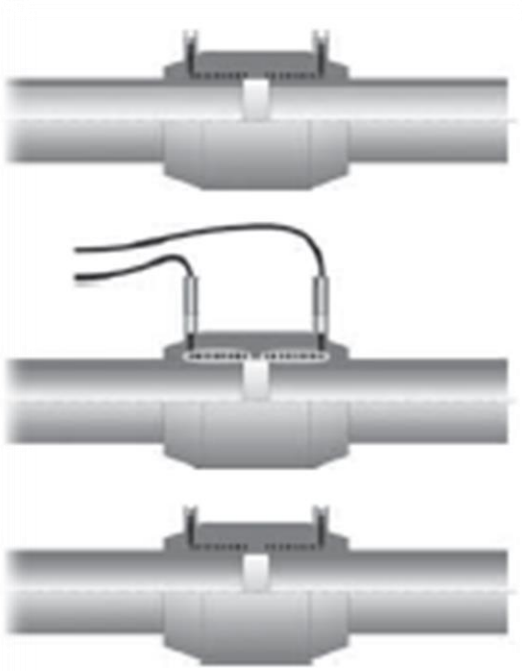
- ½” – 8” (20mm – 200mm OD) couplings and fittings
- 10” – 24” (250mm – 630mm OD) couplings only
- Fittings and couplings are manufactured with a molded-in-place resistance wire
- Voltage is applied to create resistance which generates heat to melt the PP-RCT material

- Best suited for in place (field joint) welding situations
- Barcoded fittings and multi-function welding units allow for consistent fusion joints



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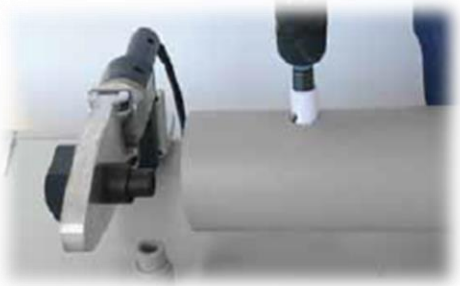

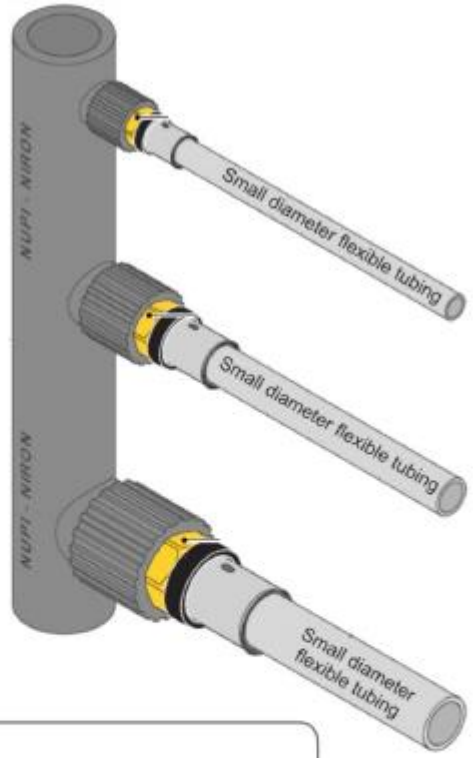

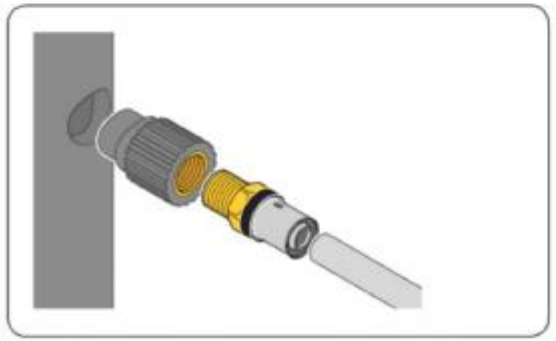

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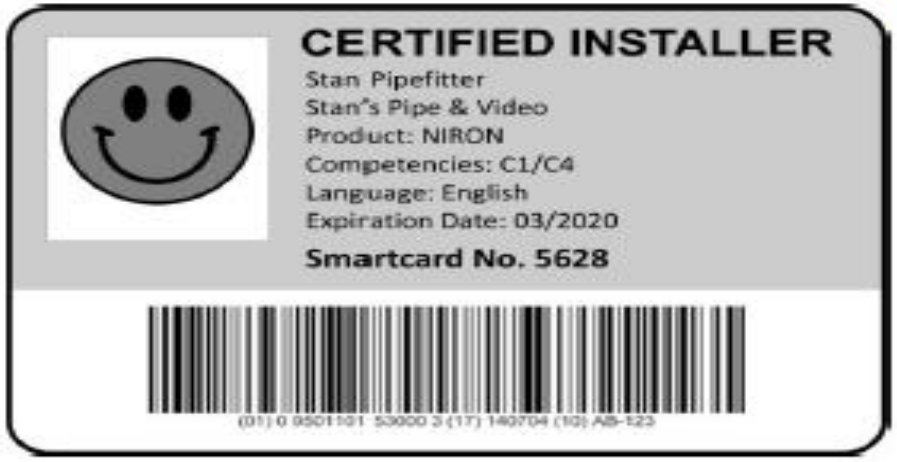
Installer Training

- Installers to be trained on NIRON joining and installation procedures
- Each joining method requires specific training for certification badge
- Trainings can be done at jobsite, installer's place of business



- After completion of training, installers will receive a SmartCard from NUPI Americas, showing proficiency on different installation methods

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Let's Review

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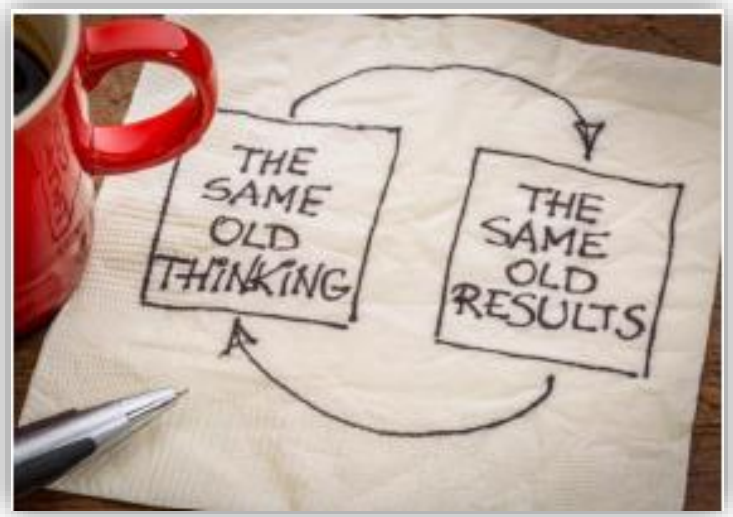
WHO

- Nupi Americas is a leading worldwide manufacturer of Polypropylene piping systems.
- Nupi operates worldwide, and from Houston, TX and Early Branch, SC in the USA.
- FW Webb is the largest plumbing and heating distributor in the Northeast.

WHAT

- NUPI NIRON PP-RCT is the most advanced beta-crystalline resin in the world.
- NIRON is apressure & Temperature piping system that is joined via heat fusion
- NIRON available from ½" diameter to 24" diameter with a range of SDR wall thicknesses
- Features the greatest number joining systems in the market:
  - Socket Fusion for ½" to 5"
  - Butt End Fusion for 2" to 24"
  - Electrofusion for ½" to 24"
  - Mechanical Joint for ½" to 4"
- UV protected NERO Piping System also available



WHERE

- Chilled water systems / Cooling towers
- Hydronic heating systems
- Compressed air systems
- Potable water
- Chemical conveyance
- Food / Beverage / Pharmaceutical Industry
- Military applications
- Glycol systems
- Microelectronics industry
- Pulp and paper production
- Textile manufacturing
- Mining industry
- Livestock / Dairy
- Shipbuilding industry

WHY

- NIRON is a hydrophobic material - no scaling / Corrosion / Erosion
- NIRON is made from a non-toxic material - no toxic leaching or off-gassing
- NIRON has an expected service life of 100+ years
- NIRON has an application temperature range of -20°F to +248°F
- NIRON is pressure rated up to 525 psi
- NIRON has a 30-year fully backed manufacturer warranty - the BEST in the industry
- NIRON weighs approximately 70% less than steel - one 4" x 20' piece of NIRON weighs 73 lbs - versus 216 lbs for the same size steel pipe
- NIRON is pre-fabrication friendly
- NIRON pipe available size range is ½" through 24" diameter
- NIRON pipe comes in 20' standard lengths, not metric (shorter) lengths like the others
- NIRON requires no chemical treatment
- NIRON joining process eliminates the need for a fire watch or permit
- NIRON used on potable cold water installations needs no insulation