

DISTRIBUTION PIPING MATERIALS: BUILDING HYDRONIC SYSTEM MANAGEMENT

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**UTILITIES & ENERGY
SERVICES**
TEXAS A&M UNIVERSITY

Piping at Texas A&M

History of Distribution Piping at Texas A&M

- Concrete reinforced piping
- Concrete
- Ductile iron
- Galvanized
- Copper
- Clay tile
- Steel
- Stainless Steel
- HDPE is now used on all water systems

HDPE Piping Specifications

PIPING

- High Density Polyethylene (HDPE) PE 4710
- Dow 2499 resin (140 – 180 F)
- SDR 11 on all pressurized systems
- SDR 17 for sanitary sewer piping
- Corrugated SDR 17 for storm water piping

INSULATION

Mineral powder (GILSULATE® 500) to meet insulative qualities, density and compaction requirements



HDPE Piping Benefits

- No corrosion
- Long joint free runs (20 to 50 feet)
- Limited impact by ground shearing forces
- Extremely flexible – less joints
- Decreased friction – improved flow characteristics
- Minimal internal material build up
- Longevity – 100+ year pipe
- Wide range of operating conditions
- Does not deteriorate in sun light
- Easier installation and repair

HDPE Piping Techniques

- Simple slip-lining
- Swaglining
- Fold and band pipe insertion
- Static pipe bursting
- Open trench
- Boring



Projects



**Chilled water lines with
Gilsulate insulation**



Projects



Reroute of 12" domestic cold water line around Olsen ball park



Projects



**Chilled water supply and return
to a dorm on campus**

Projects



**Chilled water and heating hot water
supply and return to a new rec
facility dorm on campus**



Projects



Projects

**West Campus
Thermals**



**West Campus
Storm Drain**



GILSULATE®500XR



A standard in efficiency, sustainability and environmentally stable.



**Underground Controlled Density Insulating Fill
& Corrosion Protection System**



Insulating your underground distribution system with a highly efficient and reliable system can provide a return on your investment many times over.

Benefits include:

- ROI: Proven quick payback, savings are compounded over the life of the system.
- Minimize maintenance: Maintenance is eliminated.
- Maximize Equipment Life: Highly efficient insulation extends your equipment life.
- Reduce Greenhouse Gas: Emitting less gases because the system burns less fuel.
- Use LESS Existing Available Energy: Promote creating less new energy.
- Prevent Corrosion: One products insulates and protects your metallic piping system.



Gilsulate® - The Trade Name with 70 Years of Research, System Design and Testing



Gilsulate®500XR is patented as an underground insulation, providing corrosion protection and excellent load bearing properties

- Exceeds UFGS-33.61.13 (2.4) including “Manufacturer”, ASTM Code & Standard requirements
- Meets ASTM C177-04 Installed
- Meets ASTM D-1895 Method A & C installed
- Works in Multiple Temperature Zones: Temperature range of 35°F - 800°F.
- Fits any size pipe, type of pipe, or configuration of pipes – out of the bag.
- High Load Bearing Material - Will support the weight of the pipe, backfill & roadway.
- High Electrical Resistivity – Prevents Corrosion
- Prevents water intrusion to the piping system



For Underground Distribution Systems - Chilled Water, Hot Water, Steam, Condensate



HDPE AND PP-RCT PIPING SYSTEMS

**IDEA Campus Energy
Denver, CO
10 February 2015**



HDPE and PP-RCT – Indoor vs. Outdoor

Indoor – PP-RCT



Outdoor - HDPE



HDPE – WHY CHOOSE HDPE

Benefits of HDPE Pipe Systems

- Homogeneous, monolithic thermal fusion joint
- Zero Leakage
- Fully Restrained - No Thrust Blocks
- Allows Installation Under Tension (HDD, Pipe Bursting, and slip-lining)
- Butt fused joint is as strong as pipe



HDPE - MATERIALS

Features and Benefits, Cont.

- **Hydraulically efficient**
 - Smooth non-wetting bore
 - Maintains Hazen-Williams C-Factor (C = 150) Long Term
- **Corrosion, abrasion & chemical resistant**
 - Does not rust, rot, corrode, or tuberculate
 - Resistant to acids, bases & salts
- **Requires no lining, no coating, or cathodic protection**



HDPE – THOSE POOR PUMPS

Benefits of HDPE Pipe Systems

Ductile Iron Pipe
Tuberculation in
10 Years



HDPE Pipe
Tuberculation Free
Lifetime



WHAT IS SUPPLYING YOUR EQUIPMENT?

ISCO HDPE is completely corrosion resistant, offering the best quality supply for your equipment and bottom-line.

HDPE - MATERIALS

Features and Benefits, Cont.

- Life span of 50-100 years
- Available in sizes 12mm (1/2") to 2000mm (78")
- Pressure Rated up to 60°C (140°F) *
- Drainage 82°C (180°F)
- Pressure/temperature matrix – basis at 22°C/73°F



HDPE – Always Improving

NEW FORMULA RESIN 2499 - HHW lines

- Life span of 50-100 years
- UV Inhibited for above ground use
- Available in sizes 50mm (2") to 1625mm (65")
- Pressure Rated up to 82.2°C (180°F)



HDPE - SPECIFICATIONS

Grade Designation – AS/NZS, ISO, ASTM

AS/NZS

AS/NZS 4131 Resin

AS/NZS 4130 Pipe

AS/NZS 4129 Fittings

Resin: *PE100*

ISO

ISO 4427-1 General

ISO 4427-2 Pipe

ISO 4427-3 Fittings

ISO 4427-5 Fit for

Purpose

Resin: *PE100*

ASTM

ASTM - F714 – Pipe

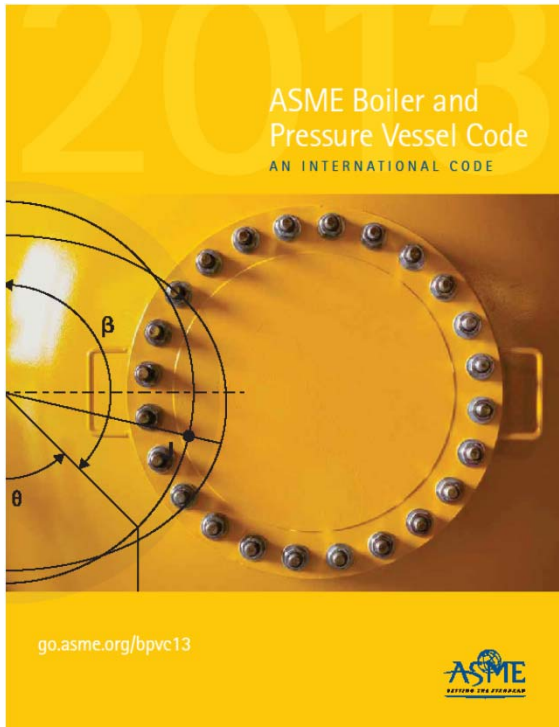
ASTM - F2206 – Fittings

ASTM – F2620 - Fusion

Resin: *PE3608/PE4710*



QUALITY



N-3822 N-3680

ASME & ISCO's Commitment to Quality

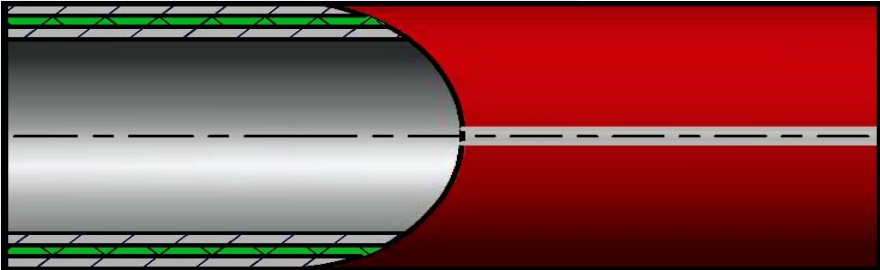
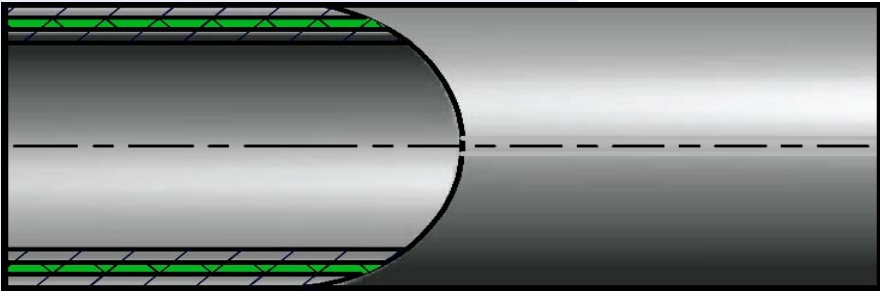
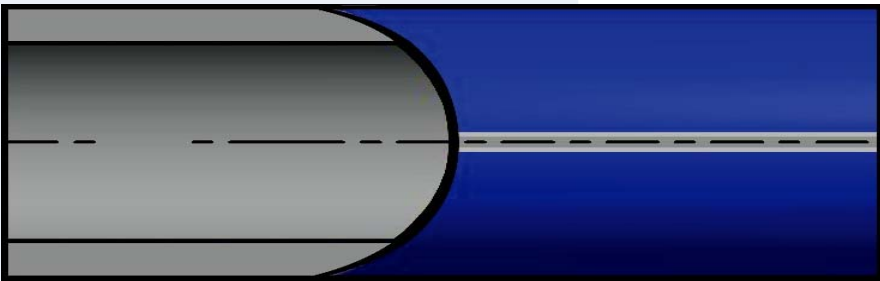
- HDPE used in Commercial and Safety Related piping systems
- Factory Mutual (FM) Approved
- ASME Code Cases N-755 & N-808
- ISCO is first ASME HDPE Piping System Certificate of Authorization Holder
- ISO 9001:2008 Program



■ PP-RCT: Replacing theses systems near you



PP-RCT For your inside job

HIGH TEMPERATURE HOT (POTABLE) WATER, COMPRESSED AIR		
HVAC/HYDRONIC, CHEMICAL TRANSPORT COMPRESSED AIR		
COLD (POTABLE) WATER		

PP-RCT – The CT Difference

System Design = 180°F @ 100PSI

PP-RCT= DR11

P-R= DR6

- 1.) Less material = quicker fusion time = lower cost
- 2.) Larger Inside Diameter (I.D.) = greater flow
- 3.) Lighter to handle and install

PP-RCT – The CT Difference

System Design = 203°F

PP-RCT

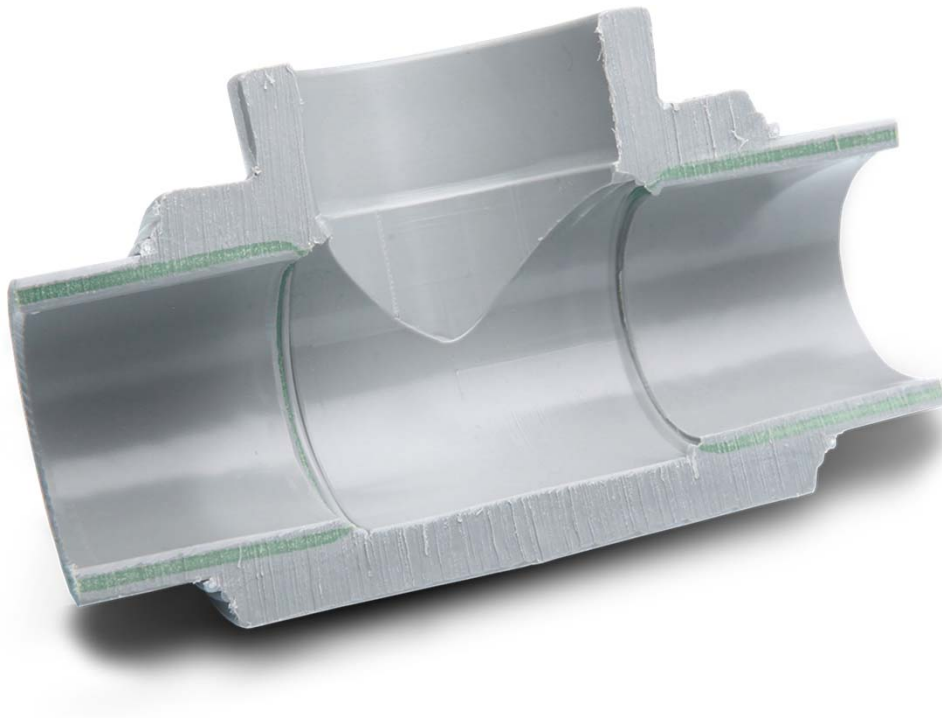
DR 7.4 = 120PSI

PP-R

DR7.4 = 60PSI

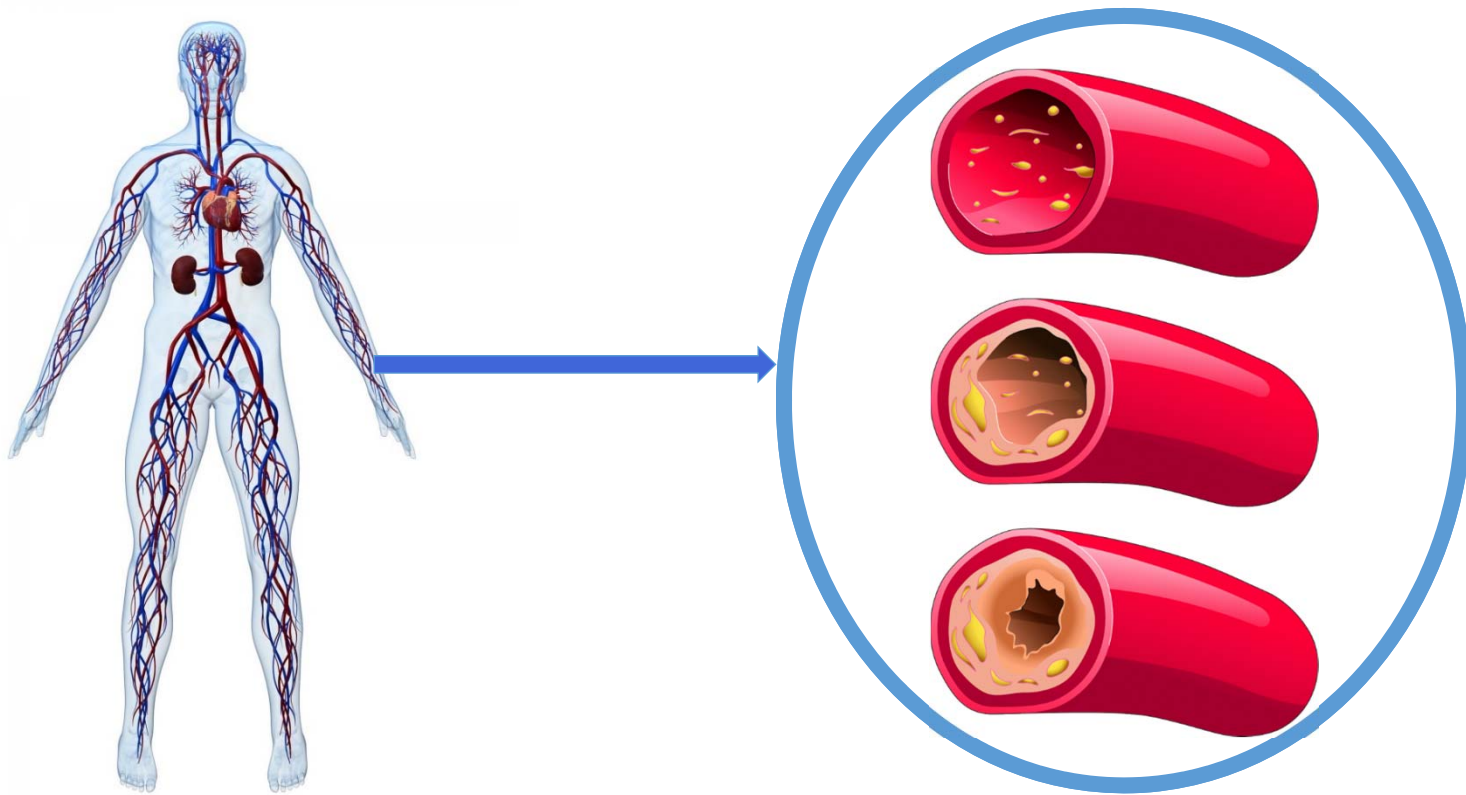
At elevated temperatures, PP-RCT can handle twice the pressure compared to standard PP-R

PP-RCT: Reliability

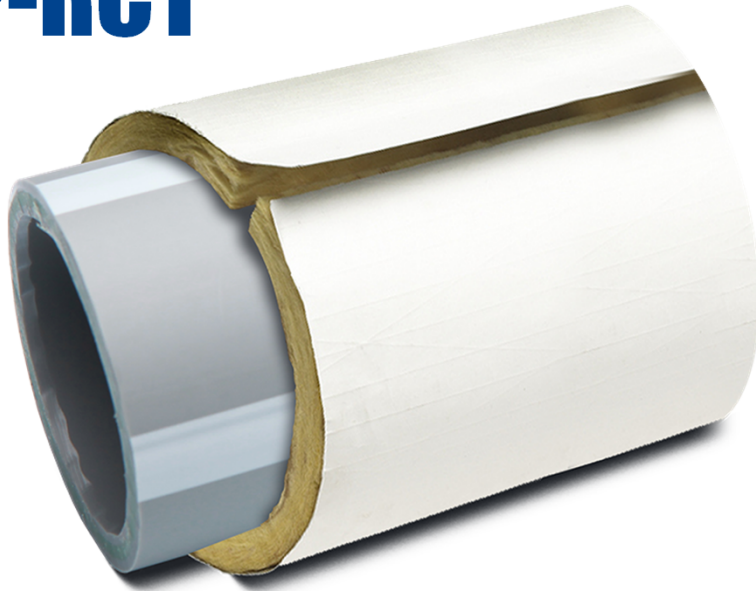


- A permanent homogeneous, leak-free connection
- The most reliable connection - Does not require glue, O-rings, solder or gaskets to form a connection
- Heat Fusion - Trusted by the AGA for more than 30 years, this method makes our joints the strongest part of the system

PP-RCT: Pipes are like veins

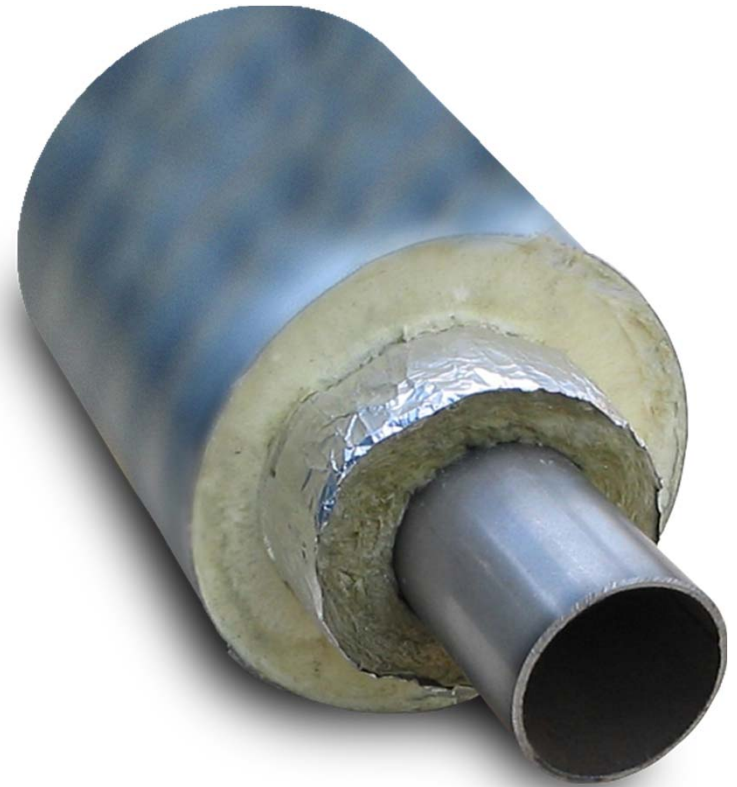


PP-RCT



REDUCED INSULATION

Better natural R Value compared to metallic piping systems



PP-RCT: Quick Test

Socket Fusion:

- ½" - 4"

Butt Fusion

- 2" - 24"

Both can be Air Tested



Environmentally Friendly



PP-RCT ECO-FRIENDLY PIPING SOLUTIONS

- **PP-RCT does not emit any toxins, or carcinogens when burned.**
- **100% Recyclable**