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Today's Plastic Piping Solutions for Building and Construction

A presentation by the Plastics Pipe Institute

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Presentation Outline

1. Introduction to PPI and the Building & Construction Division

2. Plastic Piping Solutions for Building & Construction Division
   - CPVC *Chlorinated polyvinyl chloride*
   - PEX *Crosslinked polyethylene*
   - PE-RT *Polyethylene of raised temperature*
   - PP *Polypropylene pressure pipe*
   - HDPE *High density polyethylene*

3. Applications addressed by these piping solutions

4. Information about relevant PPI publications and resources

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1. The Plastics Pipe Institute

PPI Represents All Sectors of the Plastic Pipe Industry
- PPI was formed in 1950 to develop test methods for plastic pressure pipes
- Today: Non-profit trade association serving North America

PPI Mission: To advance the acceptance and use of plastic pipe systems through research, education, technical expertise and advocacy

Members: PPI members share a common interest in broadening awareness and creating opportunities that expand market share and extend the use of plastics pipe in all of its many applications

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The Plastics Pipe Institute

PPI Represents All Sectors of the Plastic Pipe Industry

- Today, PPI's five divisions focus on solutions for multiple applications:
  - **Building & Construction Division**
  - Corrugated Plastic Pipe
  - Energy Piping Systems Division
  - Municipal & Industrial Division
  - Power & Communications Division

PCD: HDPE Conduit for fiber optic

EPSD: Gas distribution piping

MID: HDPE water mains

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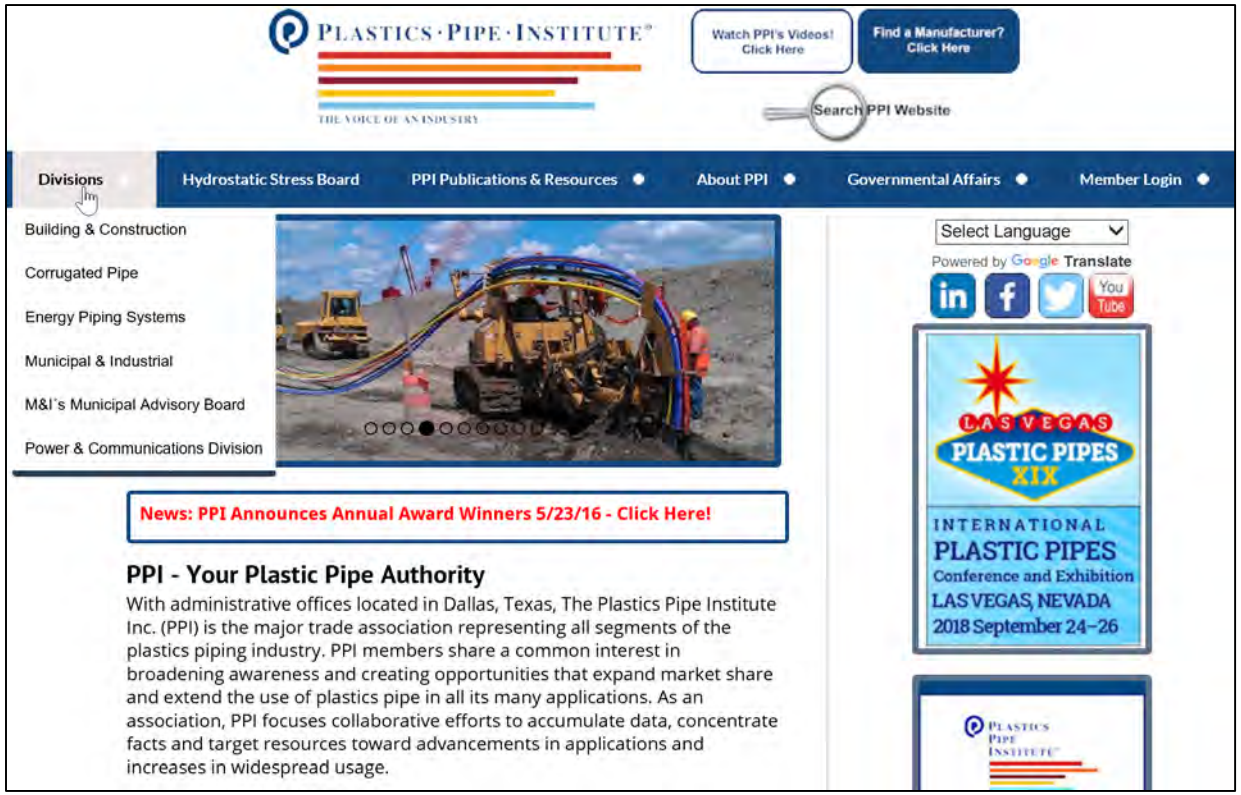
The Plastics Pipe Institute

PPI Represents All Sectors of the Plastic Pipe Industry

- PPI Homepage
- How to access various divisions

www.plasticpipe.org



The Plastics Pipe Institute

PPI Members

- PPI has over 160 Member firms:
  - Producers of materials and additives
  - Converters – producers of pipes and fittings
  - Equipment manufacturers (extrusion, joining)
  - Code bodies, SDOs, certification agencies
  - Consultants
- Ten full-time employees
- Based in Irving, TX
  - 105 Decker Ct. Suite 825
  - Irving, TX 75062

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Building & Construction Division (BCD)

- BCD is focused on plastic pressure pipe and tubing systems used within buildings and on building premises

Applications

- Plumbing, water service, reclaimed water, fire protection, radiant heating and cooling, snow and ice melting, hydronic piping and distribution, chilled water, pre-insulated piping, ground source geothermal piping systems, and turf conditioning

Materials:

- **CPVC, PEX, PE-RT** and **PP** pressure pipes
- New for 2018: **HDPE** pipes for geothermal

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The Plastics Pipe Institute

Building & Construction Division

- Primary Activities of staff, committees and task groups:
  - Research & Development
  - Communications and Marketing (PR, promotions)
  - Advocacy (technical responses to research, government affairs)
  - Education (development of CEU-style courses, webinars, etc.)
  - Codes & Standards development work

Building & Construction Division Mission

“To promote the expanded acceptance and use of high reliability plastic pressure pipe and tubing systems in building and construction environments by providing research, education, and code/standard development with a focus on delivering sustainable and safe plastic system solutions that enrich people's lives.”

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The Plastics Pipe Institute

Building & Construction Division

- Related to Codes & Standards, BCD is involved with many industry groups
- PPI staff serves on technical committees representing our membership
- BCD shares industry updates with Members in regular meetings

American Water Works Association

ASPE American Society of Plumbing Engineers

ASME SETTING THE STANDARD

ASHRAE

ASTM INTERNATIONAL Standards Worldwide

CSA Group

IAPMO

ICC ES PMG

NSF International

Proud member of the RPA RADIANT PROFESSIONALS ALLIANCE www.radiantprofessionalsalliance.org

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2. Today's Plastic Piping Solutions for Building & Construction

CPVC: Chlorinated Polyvinyl Chloride

- A high-temperature pressure piping system
- Introduced for potable plumbing in 1959
- Introduced for fire protection in 1985
- Also used for many industrial and process piping applications

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Today's Plastic Piping Solutions for Building & Construction

CPVC: Advantages

- Safety of potable water and long-term reliability
- Corrosion resistance, chlorine and chloramine resistance
- No flame used for joining; solvent weld joints
- Lightweight, easy to transport
- No scrap value; avoid jobsite theft
- Available in wide range of sizes
- Universal compatibility of pipes/fittings
- Professional installed appearance

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Today's Plastic Piping Solutions for Building & Construction

PEX: Crosslinked Polyethylene

- Introduced for radiant heating in the early 1970s in Europe
- Introduced to USA and Canada in early 1980s for heating and plumbing
- A high-temperature flexible pressure piping system
- PEX tubing systems are used for water service lines, hot- and cold-water distribution, radiant heating and cooling, outdoor snow and ice melting, residential fire protection, geothermal ground loops and other demanding applications

Courtesy REHAU

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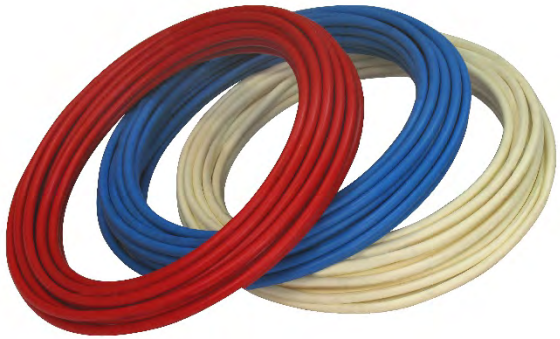
Today's Plastic Piping Solutions for Building & Construction

PEX: Advantages

- Safety of potable water and long-term reliability
- Corrosion resistance, chlorine and chloramine resistance
- Flexibility to speed installations
- Ease of installation
- Lightweight, easy to transport
- Noise and water hammer resistance
- No flame used for joining; compression fittings
- No scrap value; avoid jobsite theft
- Many fitting and joining options



Courtesy NIBCO

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Today's Plastic Piping Solutions for Building & Construction

PE-RT: Polyethylene of Raised Temperature

- First used for warm-water radiant heating in the 1990s in Europe
- Introduced to North America in the 2000s
- A high-temperature flexible pressure piping system
- PE-RT tubing systems are used for hot- and cold-water plumbing, water service lines, radiant heating and cooling, outdoor snow and ice melting, and other demanding applications

Courtesy Dow

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Today's Plastic Piping Solutions for Building & Construction

PE-RT: Advantages

- Safety of potable water and long-term reliability
- Corrosion resistance, chlorine and chloramine resistance
- Flexibility to speed installations
- Ease of installation
- Lightweight, easy to transport
- Noise and water hammer resistance
- No flame used for joining; compression fittings
- No scrap value; avoid jobsite theft
- Many fitting and joining options; works with many of the same fittings as PEX tubing


Courtesy Dow

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Today's Plastic Piping Solutions for Building & Construction

PP: Polypropylene Pressure Pipes


Courtesy Pestan NA

- First used in the 1970s in Europe for hydronic heating, then in the 1990s for plumbing
- Introduced to North America in the 2000s
- High-temperature rigid pressure piping systems
  - Two types: PP-R and PP-RCT
- PP pressure piping systems are used for hot- and cold-water plumbing, hydronic heating and cooling, industrial and food-grade piping and other demanding applications
- PP pipes also provide resistance to highly acidic and basic solutions

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Today's Plastic Piping Solutions for Building & Construction

PP: Advantages

- Resistant to corrosion, chlorine and chloramines
- Safety of potable water and long-term reliability
- Ease of installation with professional appearance
- Lightweight, easy to transport
- Lower installed cost than metal pipes
- Heat-fused joints; no flame used for joining
- No scrap value; avoid jobsite theft
- Some PP pipes include reinforcement layers for reduced longitudinal expansion/contraction


Courtesy Aquatherm

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3. Applications Addressed by BCD Plastic Piping Solutions

Water Service

- PEX tubing is certified to **AWWA C904** for Water Service applications
- PE-RT tubing is certified to **AWWA C901**
- Less expensive than copper; no scrap value
- Resistant to corrosion and mineral build-up
- Long coils and high flexibility ease installations
- Impact resistance and abrasion resistance
- Highly resistant to chlorine and chloramines (disinfectants)

American Water Works Association

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Applications Addressed by BCD Plastic Piping Solutions

Hot- and Cold-water Plumbing Distribution

- PEX, PE-RT and CPVC are used for residential plumbing supply pipes
- PP is more commonly used in larger diameters, commercial applications

Benefits:

- Optimized designs can save water
- Plastic pipes are corrosion-resistant
- Pipes are quieter and transfer less heat
- Plastic pipe can reduce installation costs while improving long-term performance and reliability


Courtesy Uponor

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Applications Addressed by BCD Plastic Piping Solutions

Fire Protection

- CPVC is approved for residential fire protection applications according to codes **NFPA 13D** and **13R;** certain PEX systems are approved to **NFPA 13D**
- Life safety systems stop fires where they develop

Benefits:

- FP systems save lives
- FP systems reduce property damage
- Plastic pipe can reduce installation costs while improving long-term performance and reliability


Courtesy Lubrizol

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Applications Addressed by BCD Plastic Piping Solutions

Radiant Heating, Radiant Heating & Cooling

- PEX or PE-RT tubing is embedded in floors, walls or ceilings
- Heated or chilled water is circulated through the tubing for energy transfer

Benefits:

- Improved thermal comfort
- Architectural freedom
- Energy flexibility
- Higher efficiency
- Invisible and silent
- Zoneability, controllability


Courtesy REHAU

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Applications Addressed by BCD Plastic Piping Solutions

Snow and Ice Melting (SIM)

- SIM systems augment the removal of snow and ice by circulating a heat transfer fluid through plastic pipes

Benefits:

- Convenience
- Increased safety and reduced liability
- Minimized environmental impact
- Lower operating costs
- Long-lasting reliability

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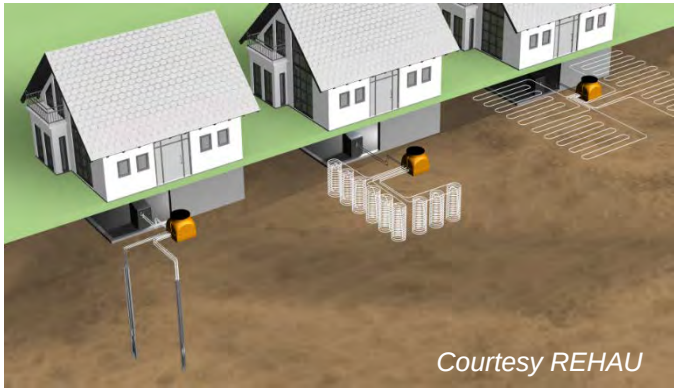
Applications Addressed by BCD Plastic Piping Solutions

Ground Source Geothermal Piping Loops

- Ground source heat pumps are the most efficient source of heating and cooling energy for any type of building (vs. boilers, furnaces, VRF, etc.)
- HDPE, PEX and PE-RT tubing are specifically approved in IGSHPA and CSA standards for ground loop piping (a.k.a. the ground heat exchanger)

Benefits:

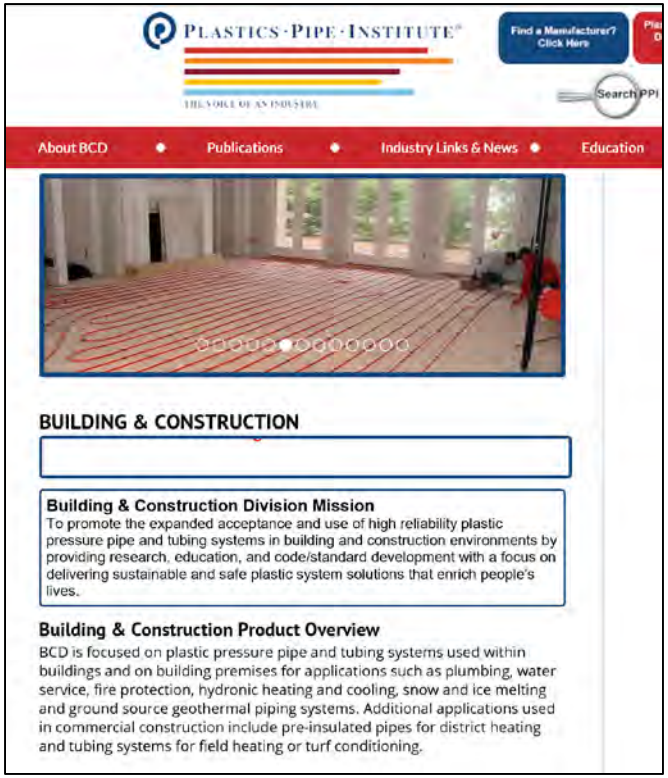
- Geothermal heat pumps can have efficiencies greater than 450% (in heating mode)
- Heat is rejected to the earth in cooling mode
- Combine with thermal solar collectors



4. PPI Publications and Resources

Please visit our website for:

- Technical Notes and Technical Reports
- Recommendations and Statements
- Handbooks and Design Guides
- Plastic Pressure Pipe Design Calculator
- Educational videos
- Case studies
- Finding Manufacturers
- Connecting with other organizations
- www.plasticpipe.org/building-construction



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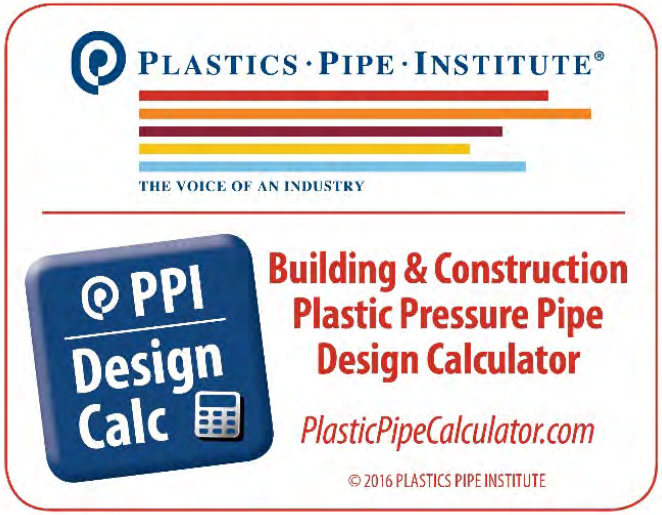
PPI Publications and Resources

Plastic Pressure Pipe Design Calculator

- For piping design calculations related to pressure loss, pipe weight/volume, thermal expansion & contraction, expansion arm/loop design, and to predict hydraulic shock & pressure surges, visit www.plasticpipecalculator.com



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PPI Publications and Resources

Industry Links

- Get direct access to standards developments organizations (SDOs), product certification agencies, code bodies and other related associations at this BCD webpage

INDUSTRY LINKS

ANSI - American National Standards Institute
ASHRAE - American Society of Heating, Refrigeration and A/C Engineers
ASME - American Society of Mechanical Engineers
ASPE - American Society of Plumbing Engineers
ASSE - American Society of Sanitary Engineers
ASTM - American Society for Testing and Materials
AWWA - American Water Works Association
CSA Group - Canadian Standards Association
CIPH - Canadian Institute of Plumbing & Heating
DOE – Department of Energy Race To Zero
IAPMO International Association of Plumbing and Mechanical Officials
IAPMO USEHC Timeline for 2018
IAPMO UPC & UMC Timeline for 2018
IAPMO Timelines for 2021 Codes
ICC - International Code Council
ICC Code Development Cycle 2018/2019
IGSHPA - International Ground Source Heat Pump Association
NFPA - National Fire Protection Association
NFPA 13 Details
NFPA 13R Details
NFPA 13D Details
NSF - NSF International
PIAC - Plumbing Industry Advisory Council
PPFA - Plastic Pipe and Fittings Association
RPA - Radiant Professionals Alliance
UL - Underwriters Laboratories
ULC - Underwriters Laboratories of Canada

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PPI Publications and Resources

Social Media

PPI is active in the big three:

- Sharing publications and industry news on LinkedIn

- Connecting with users through 

- Publishing educational videos with YouTube

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Summary

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Thank you for your time!

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