

DIRECTIVE 15H-10

PIPING TYPES AND MATERIALS

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<i>Steam & Condensate Piping</i>					
Service & Location	Pipe Size	Pipe Material & Weight	Joint Type (*B)(*E)	Fitting Material	Insulation Material
Low Pressure Steam (15 psig or less) (*C)(*D)					
Inside Building	2" or smaller	Steel, Schedule 40, Grade B, ASTM A53, Type E or S	Threaded or Welded	Steel	Fiberglass w/ all service jacket
	2-1/2" or larger	Steel, Schedule 40, Grade B, ASTM A53, Type E or S	Welded	Steel	Fiberglass w/ all service jacket
Inside Tunnel	All sizes	Steel, Schedule 40, Grade B, ASTM A53, Type E or S	Welded	Steel	Mineral Wool w/ all service jacket
Direct Bury (*A)	All sizes	Steel, Schedule 40, Grade B, ASTM A53, Type E or S	Welded	Steel	Pre-insulated, Class A , Drainable, Dryable, Pressure Testable
High Pressure Steam (16 psig to 250 psig) (*C)(*D)					
Inside Building	All sizes	Steel, Schedule 40, Grade B, ASTM A53, Type E or S	Welded	Steel	Mineral Wool w/ metal jacket
Inside Tunnel	All sizes	Steel, Schedule 40, Grade B, ASTM A53, Type E or S	Welded	Steel	Mineral Wool w/ metal jacket
Direct Bury (*A)	All sizes	Steel, Schedule 40, Grade B, ASTM A53, Type E or S	Welded	Steel	Pre-insulated, Class A , Drainable, Dryable, Pressure Testable
Low Pressure Condensate (15 psig or less) (*C)(*D)					
Inside Building	2" or smaller	Steel, Schedule 80, Grade B, ASTM A53, Type E or S	Threaded or Welded	Steel	Fiberglass w/ all service jacket
	2-1/2" or larger	Steel, Schedule 80, Grade B, ASTM A53, Type E or S	Welded	Steel	Fiberglass w/ all service jacket
Inside Tunnel	All sizes	Steel, Schedule 80, Grade B, ASTM A53, Type E or S	Welded	Steel	Mineral Wool w/ all service jacket
Direct Bury (*A)	All sizes	Steel, Schedule 80, Grade B, ASTM A53, Type E or S	Welded	Steel	Pre-insulated, Class A , Drainable, Dryable, Pressure Testable
High Pressure Condensate (16 psig to 250 psig) (*C)(*D)					
Inside Building	All sizes	Steel, Schedule 80, Grade B, ASTM A53, Type E or S	Welded	Steel	Mineral Wool w/ metal jacket
Inside Tunnel	All sizes	Steel, Schedule 80, Grade B, ASTM A53, Type E or S	Welded	Steel	Mineral Wool w/ metal jacket
Direct Bury (*A)	All sizes	Steel, Schedule 80, Grade B, ASTM A53, Type E or S	Welded	Steel	Pre-insulated, Class A , Drainable, Dryable, Pressure Testable

*** Refer to the footnotes at the end of this document.**

Hydronic Piping – Hot Water					
Service & Location	Pipe Size	Pipe Material & Weight	Joint Type (*B)(*E)	Fitting Material	Insulation Material
Hot Water (<250°F) (*C)(*D)					
Inside Building	2" or smaller	Copper, Type L, Drawn, ASTM B88	Soldered	Copper or Copper Alloy	Fiberglass w/ all service jacket
		Steel, Schedule 40, Grade A or B, ASTM A53, Type E or S	Threaded (*K)	Steel	Fiberglass w/ all service jacket
	2-1/2" or larger	Steel, Schedule 40, Grade A or B, ASTM A53, Type E or S	Welded (*K)	Steel	Fiberglass w/ all service jacket
Inside Tunnel	All sizes	Steel, Schedule 40, Grade A or B, ASTM A53, Type E or S	Welded	Steel	Mineral Wool w/ all service jacket
Direct Bury (*A)	All sizes	Copper, Type L, Drawn, ASTM B88	Soldered	Copper or Copper Alloy	Pre-insulated w/ Polyurethane Foam and HDPE jacket
		Steel, Schedule 40, Grade A or B, ASTM A53, Type E or S	Welded	Steel	
Medium Temperature Water (≥250°F) (*C)(*D)(*F)					
Inside Building or Tunnel	All sizes	Steel, Schedule 40, Grade B, ASTM A53, Type E or S	Welded	Steel	Mineral Wool w/ metal jacket
Direct Bury (*A)	All sizes	Steel, Schedule 40, Grade B, ASTM A53, Type E or S	Welded	Steel	Pre-insulated, Class A , Drainable, Dryable, Pressure Testable
High Temperature Water (≥350°F) (*C)(*D)(*F)					
Inside Building or Tunnel	All sizes	Steel, Schedule 40, Grade B, ASTM A53, Type E or S	Welded	Steel	Mineral Wool w/ metal jacket
Direct Bury (*A)	All sizes	Steel, Schedule 40, Grade B, ASTM A53, Type E or S	Welded	Steel	Pre-insulated, Class A , Drainable, Dryable, Pressure Testable

* Refer to the footnotes at the end of this document.

Hydronic Piping – Chilled and Condenser Water					
Service & Location	Pipe Size	Pipe Material & Weight	Joint Type (*B)(*E)	Fitting Material	Insulation Material
Chilled Water (*C)(*D)(*G)					
Inside Building	2" or smaller	Copper, Type L, Drawn, ASTM B88	Soldered (*K)	Copper or Copper Alloy	Fiberglass w/ all service jacket and vapor barrier
		Steel, Schedule 40, Grade A or B, ASTM A53, Type E or S	Threaded (*K)	Steel	Fiberglass w/ all service jacket and vapor barrier
	2-1/2" or larger	Steel, Schedule 40, Grade A or B, ASTM A53, Type E or S	Welded (*K)	Steel	Fiberglass w/ all service jacket and vapor barrier
Inside Tunnel	All sizes	Steel, Schedule 40, Grade A or B, ASTM A53, Type E or S	Welded	Steel	Mineral Wool w/ all service jacket
Direct Bury (*A)	All sizes	Copper, Type L, Drawn, ASTM B88	Soldered	Copper or Copper Alloy	Pre-insulated w/ Polyurethane Foam and HDPE jacket
		Steel, Schedule 40, Grade A or B, ASTM A53, Type E or S	Welded	Steel	
Condenser Water (*C)(*D)(*G)(*L)					
Inside Building or Tunnel	2" or smaller	Copper, Type L, Drawn, ASTM B88	Soldered (*K)	Copper or Copper Alloy	None
		Steel, Schedule 40, Grade A or B, ASTM A53, Type E or S	Threaded (*K)	Steel	None
		PVC, Schedule 40, Pressure Pipe, ASTM D1785	Solvent Welded	PVC	None
	2-1/2" or larger	Steel, Schedule 40, Grade A or B, ASTM A53, Type E or S	Welded (*K)	Steel	None
		PVC, Schedule 40, Pressure Pipe, ASTM D1785	Solvent Welded	PVC	None
Direct Bury (*A)	All sizes	Steel, Schedule 40, Grade A or B, ASTM A53, Type E or S	Welded	Steel	Pre-insulated w/ Polyurethane Foam and HDPE jacket
		PVC, Schedule 40, Pressure Pipe, ASTM D1785	Solvent Welded	PVC	None

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Fire Protection Piping					
Service & Location	Pipe Size	Pipe Material & Weight	Joint Type (*B)(*E)	Fitting Material	Insulation Material
Fire Protection (*C)(*D)					
Inside Building Wet Piping System	All sizes	Steel, Schedule 40, Grade A, ASTM A53, Type E or S	Threaded, Welded or Groove Joint	Cast Steel, Steel or Ductile Iron	None
Inside Building Dry Piping System	All sizes	Steel or Galvanized Steel, Schedule 40, Grade A, ASTM A53, Type E or S	Threaded, Welded or Groove Joint	Cast Steel, Steel or Ductile Iron	None
Beneath Floor Slab	All sizes	Ductile Iron, Class 52, Cement Lined Asphaltic Coating, AWWA C151	Mechanical Joint Lock w/ thrust blocks	Ductile Iron	None
		PVC, Schedule 40, Pressure Pipe, ASTM D1785	Bell & Spigot w/ thrust blocks	PVC	None

* Refer to the footnotes at the end of this document.

Plumbing Piping - Domestic Water, Sanitary, Storm, Waste, Vent					
Service & Location	Pipe Size	Pipe Material & Weight	Joint Type (*B)(*E)	Fitting Material	Insulation Material
Domestic Cold Water (*C)(*D)					
Inside Building	All sizes	Copper, Type L, Drawn, ASTM B88	Soldered (*K)	Copper or Copper Alloy	Fiberglass w/ all service jacket and vapor barrier
Beneath Floor Slab	2" or smaller	Copper, Type K, Soft Annealed Coils, ASTM B88	None (*H)	None	None
	2-1/2" or larger	Ductile Iron, Class 52, Cement Lined Asphaltic Coating, AWWA C151	Mechanical Joint Lock w/ thrust blocks	Ductile Iron	None
		PVC, Schedule 40, Pressure Pipe, ASTM D1785	Bell & Spigot w/ thrust blocks	PVC	None
Domestic Hot Water (*C)(*D)					
Inside Building	All sizes	Copper, Type L, Drawn, ASTM B88	Soldered	Copper or Copper Alloy	Fiberglass w/ all service jacket
Beneath Floor Slab	All sizes	Copper, Type K, Drawn, ASTM B88	Soldered	Copper or Copper Alloy	Pre-insulated w/ Polyurethane Foam and HDPE jacket
Sanitary, Storm, Waste, and Vent (*C)(*D)(*L)					
Inside Building	All sizes	Copper, Type DWV, ASTM B306	Soldered	Copper or Copper Alloy	Fiberglass w/ all service jacket <u>on Storm Piping Only</u>
		PVC, Schedule 40, Type DWV, ASTM D2665 or D2949	Solvent Welded	PVC	Fiberglass w/ all service jacket <u>on Storm Piping Only</u>
		Cast Iron, Asphaltic Coating, Service Weight, ASTM A74	Bell & Spigot or No Hub w/ heavy duty SS clamp	Cast Iron	Fiberglass w/ all service jacket <u>on Storm Piping Only</u>
Beneath Floor Slab	All Sizes	Copper, Type DWV, ASTM B306	Soldered	Copper or Copper Alloy	None
		PVC, Schedule 40, Type DWV, ASTM D2665 or D2949	Solvent Welded	PVC	None
		Cast Iron, Asphaltic Coating, Service Weight, ASTM A74	Bell & Spigot	Cast Iron	None
Cooling Coil Condensate (*L)					
Inside Building	All sizes	Copper, Type DWV, ASTM B306	Soldered (*K)	Copper or Copper Alloy	Fiberglass w/ all service jacket & vapor barrier - OR- elastomeric
		PVC, Schedule 40, Type DWV, ASTM D2665 or D2949	Solvent Welded	PVC	Fiberglass w/ all service jacket & vapor barrier - OR - elastomeric

* Refer to the footnotes at the end of this document.

Miscellaneous Piping					
Service & Location	Pipe Size	Pipe Material & Weight	Joint Type (*B)(*E)	Fitting Material	Insulation Material
Natural Gas (*C)(*D)					
Above Ground (*I)	2" or smaller	Steel, Schedule 40, Grade A, ASTM A53, Type E or S	Threaded or Welded	Malleable Iron or Steel	None
	2-1/2" or larger	Steel, Schedule 40, Grade A, ASTM A53, Type E or S	Welded	Steel	None
Fuel Oil (*C)(*D)(*L)					
Above Ground	2" or smaller	Copper, Type L, Drawn, ASTM B88	Soldered	Copper or Copper Alloy	None
		Steel, Schedule 40, Grade A, ASTM A53, Type E or S	Welded	Steel	None
	2-1/2" or larger	Steel, Schedule 40, Grade A, ASTM A53, Type E or S	Welded	Steel	None
Direct Bury (Double Containment)	All Sizes	Copper, Type K, Annealed, ASTM B88 Primary Piping w/ PE, FRP or PVC Containment Pipe	Soldered	Copper or Copper Alloy	None
		Steel, Schedule 40, Grade A, ASTM A53, Type E or S Primary Piping w/ PE, FRP or PVC Containment Pipe	Welded	Steel	None
Refrigerant					
Inside Building	All Sizes	Copper, Type ACR, Drawn, ASTM B280	Brazed	Copper or Copper Alloy	Flexible Elastomeric
Outside Building	All Sizes	Copper, Type ACR, Drawn, ASTM B280	Brazed	Copper or Copper Alloy	Flexible Elastomeric with PVC jacket containing UV Inhibitor
Compressed Air (*C)					
Inside or Outside Building Above Ground	All sizes	Copper, Type L, Drawn, ASTM B88	Soldered	Copper or Copper Alloy	None
Inside or Outside Building Direct Bury	All sizes	Copper, Type K, Soft Annealed Coils, ASTM B88	None (*H)	None	None

* Refer to the footnotes at the end of this document.

Laboratory Piping					
Service & Location	Pipe Size	Pipe Material & Weight	Joint Type (*B)(*E)	Fitting Material	Insulation Material
Medical Air, Gas & Vacuum					
Inside Building	All Sizes	Copper, Type L, Drawn ASTM B88	Brazed	Copper or Copper Alloy	None
Acid Waste (*C)(*L)					
Inside Building <u>Note:</u> PP & PVDF Require Continuous Support Pipe Hangers	All sizes	PP (Polypropylene), ASTM F1412, Flame Retardant	Heat Fusion	PP	None
		PVDF (Polyvinylidene Fluoride), ASTM F1673	Heat Fusion	PVDF	None
		CPVC (Chlorinated Polyvinyl Chloride), ASTM D1784 Schedule 40, NSF CW-SE Certified	Solvent Welded, ASTM F493	CPVC	None
		Borosilicate Glass, ASTM C1053	SS Compression Coupling, TFE Seal	Borosilicate Glass	None
		Silicon Iron, ASTM A518/A861	Bell & Spigot & Acid Resistant Sealant	Cast Iron	None
Direct Bury (Double Containment)	All sizes	PP (Polypropylene), ASTM F1412, Flame Retardant	Heat Fusion	PP	None
		PVDF (Polyvinylidene Fluoride), ASTM F1673	Heat Fusion	PVDF	None
Quality Water (RO & DI) (*L)					
Inside Building <u>Note:</u> PP & PVDF Require Continuous Support Pipe Hangers	All sizes	PP (Polypropylene), ASTM D4101	Electrofusion	PP	None
		PVDF (Polyvinylidene Fluoride) ASTM D3222	Electrofusion	PVDF	None
		Stainless Steel	Threaded	Stainless Steel	None

* Refer to the footnotes at the end of this document.

FOOTNOTES:

- (*A)** Requires Prior SUCF Approval
- (*B)** Valve and equipment connections shall be made with unions (for threaded or soldered piping); or flanges (for welded piping).
- (*C)** Protect piping that passes through or beneath footings or foundation walls per PCNYS.
- (*D)** See Directive 2-3 “Site Utilities” for more information on site piping requirements.
- (*E)** Weld-o-lets and thread-o-lets are permitted for steel branch connections 2 or more sizes smaller than the main. Holes for weld-o-lets and thread-o-lets shall be machined (torch cutting not acceptable). Copper branch connections shall be made with tee fittings (mechanically extracted collars not acceptable).
- (*F)** See Directive 15H-6 “High and Medium Temperature Water Systems” for more information regarding medium and high temperature water systems.
- (*G)** Insulation is not required for condenser water service.
- (*H)** Piping beneath floor slabs shall be installed with no fittings or joints.
- (*I)** Gas piping greater than 5 psig shall be welded regardless of size.
- (*J)** Reserved
- (*K)** Hot water, chilled water, domestic cold water and condenser water piping located in mechanical spaces with floor drains or outdoors may be grooved joint.
- (*L)** Plastic piping located in air distribution plenums shall have a Flame spread index < 25 and Smoke developed index < 50 per ASTM E84, as required by the BCNYS.