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Uponor ChlorFIT® Schedule 80 Corzan® CPVC Piping Systems

Design and Installation Manual

CORZAN®

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Table of Contents

Foreword

This design and installation manual is published for architects, building officials, engineers, plumbers, and mechanical contractors interested in Uponor ChlorFIT® Schedule 80 Corzan® CPVC piping systems. It describes general installation recommendations that use Uponor ChlorFIT piping products. Refer to local codes for additional requirements.

GF Building Flow Solutions has made reasonable efforts to collect, prepare, and provide quality information and material in this manual. However, system enhancements may result in modification of features or specifications without notice.

GF Building Flow Solutions is not liable for installation practices that deviate from this manual or are not acceptable practices within the mechanical trades, codes, or standards of practice.

Direct any questions regarding the suitability of an application or a specific design to a local representative by calling 888.594.7726. Technical Support is also available via email at Support.UNA@georgfischer.com.

Throughout this document, there will be multiple references to the requirements of local or national codes. GF Building Flow Solutions recognizes the importance of consistent regulations and works closely with industry associations and code development bodies to ensure transparency, consistency, and safety.

It is important to understand the difference between a manufacturer's recommendation and the code requirement as it applies. If there are differences between the manufacturer's recommendations and design parameters and the enforceable code language, it is critically important that the more restrictive criteria be followed.

Where GF Building Flow Solutions' recommendations are more restrictive than the adopted code, be sure to follow the manufacturer's recommendations to promote expected product performance and coverage under the Limited Warranty.

It is important to always confirm the products, design, and intended installation are acceptable to the local Authority Having Jurisdiction (AHJ) and comply with all local codes, ordinances, and regulations prior to installation.

Glossary

Allowable stress – The maximum force per unit area that may be safely applied to a pipe.

Bell end – The enlarged portion of a pipe that resembles the socket portion of a fitting and that is intended to be used to make a joint by inserting a piece of pipe into it. Joining may be accomplished by solvent cements, adhesives, or mechanical techniques.

Bend – A fitting either molded separately or formed from pipe for the purpose of accommodating a directional change.

Beveled pipe – A pipe with an end chamfered to mate or adjust to another surface or to assist in assembly.

Bond – To attach by means of an adhesive.

Cement – A dispersion of "solution" of un-vulcanized rubber or a plastic in a volatile solvent and may or may not be an adhesive composition.

Chamfered pipe – A pipe with a conical surface (angle) made by cutting off the edge around the outside diameter on the end of a pipe.

Collapse – The buckling or crushing of a plastic pipe from external forces, such as earth loads or external hydrostatic load.

Corrosive substances – Those substances that possess in their original stage the ability through chemical action to cause damage by coming into contact with piping systems.

Crack – Any narrow opening or fissure in the surface that is visible to the naked eye.

Cure – The final stage in chemical bonding in which the chemically bonded polymer fully hardens and is ready to be pressure tested.

Deburred pipe – A pipe with the sharp edge and/or cutting remnants removed from the pipe end inner diameter or outer diameter edges.

Degradation – A damaging change in the chemical structure of a plastic.

Design pressure – The pressure to which each piping component of a piping system is designed.

Design temperature – The maximum temperature at which each piping component is designed to operate.

Ductile failure – A pipe failure mode which exhibits material deformation (stretching, elongation, or necking down) in the area of the break.

Elasticity – The property of plastic materials in which they tend to recover their original size and shape after deformation.

Elongation – The capacity to take deformation before failure in tension and is expressed as a percentage of the original length.

Fabricate – Method of forming a plastic into a finished article by machining, drawing, and similar operations.

Fitting – A piping component used to join or terminate sections of pipe or to provide changes of direction or branching in a pipe system.

Flexural strength – The outer fiber stress, which must be attained in order to produce a given deformation under a beam load.

Fuse – To join two plastic parts by softening the material using heat or solvents.

Gravity drain system – A piping system in which flow is accomplished solely by the difference between the height of the inlet end and the outlet end.

Gravity flow – Liquefied medium conveyance that is induced by a positive elevation head such as a downward pipeline slope or a higher elevation reservoir.

Hardness – A comparative gauge of resistance to indentation, not of surface hardness or abrasion resistance.

Hoop stress – The circumferential stress imposed on a cylindrical wall by internal pressure loading.

Hydrostatic design stress – The estimated maximum tensile stress in the wall of the pipe in the circumferential orientation due to internal hydrostatic pressure that can be applied continuously with a high degree of certainty that failure of the pipe will not occur.

Impact strength – Resistance or mechanical energy absorbed by a plastic part to such shocks as dropping and hard blows.

Joint – The location at which two pieces of pipe or a pipe and a fitting are connected together. The joint may be made by an adhesive, a solvent-cement, electro-fusion, mechanical device, etc.

Long-term hydrostatic strength – The estimated tensile stress in the wall of the pipe in the circumferential orientation (hoop stress) that when applied continuously will cause failure of the pipe at 100,000 hours (11.43 years). These strengths are usually obtained by extrapolation of log-log regression equations or plots.

Longitudinal stress – The stress imposed on the long axis of any shape. It can be either a compressive or tensile stress.

Lubricant – A substance used to decrease the friction between solid faces and sometimes used to improve processing characteristics of plastic compositions.

Modulus – The load in pounds per square inch or kilograms per square centimeter of initial cross-sectional area necessary to produce a stated percentage elongation which is used in the physical testing of plastics.

Nonflammable – Will not support combustion.

Nonrigid plastic – A plastic which has a stiffness or apparent modulus of elasticity of not over 10,000 PSI at 73°F (23°C), which is determined in accordance with the ASTM D790 **Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics**.

Nontoxic – Not poisonous.

Pipe – Pressure-tight cylinders used to contain and convey fluids.

Piping system – A network of piping and any associated pumps, designed and assembled to serve a specific purpose. Piping systems interface with, but exclude, major equipment, such as boilers, pressure vessels, tanks, diesel engines, turbines, etc.

Plastic – A material that contains as an essential ingredient an organic substance of large molecular weight, is solid in its finished state, and, at some stage in the manufacture or in its processing into finished articles, can be shaped by flow.

Polymer – A product resulting from a chemical change involving the successive addition of a large number of relatively small molecules (monomer) to form the polymer and whose molecular weight is usually a multiple of that of the original substance.

Polyvinyl chloride – Polymerized vinyl chloride, a synthetic resin, which when plasticized or softened with other chemicals has some rubber-like properties. It is derived from acetylene and anhydrous hydrochloric acid.

Pressure – When expressed with reference to pipe, the force per unit area exerted by the medium in the pipe.

Pressure pipe – Pipe designed to resist continuous pressure exerted by the conveyed medium.

Pressure rating – The estimated maximum pressure that the medium in the pipe can exert continuously with a high degree of certainty that failure of the pipe will not occur.

Primer – An organic solvent or a blend of solvents, which enhances adhesion, applied to plastic pipe and fittings prior to application of a solvent cement.

Rigid plastic – A plastic which has a stiffness or apparent modulus of elasticity greater than 100,000 PSI at 73°F (23°C) when determined in accordance with the ASTM D790 **Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics**.

Schedule – A pipe size system originated by the steel pipe industry that consists of outside diameters and wall thicknesses.

Self-extinguishing – The ability of a plastic to resist burning when the source of heat or flame that ignited it is removed.

Set – To convert an adhesive into a fixed or hardened state by chemical or physical action, such as condensation, polymerization, oxidation, vulcanization, gelation, hydration, or evaporation of volatile constituents.

Socket – The portion of a jointing system that is designed to accept a plain-end pipe or spigot-end pipe.

Solvent – The medium within which a substance is dissolved most commonly applied to liquids used to bring particular solids into solution, e.g., acetone is a solvent for PVC.

Solvent cement – A solvent adhesive that contains a solvent that dissolves or softens the surfaces being bonded so that the bonded assembly becomes essentially one piece of the same type of plastic.

Specific gravity – Ratio of the mass of a body to the mass of an equal volume of water at 39°F (4°C), or some other specified temperature.

Specific heat – Ratio of the thermal capacity of a substance to that of water at 59°F (15°C).

Strength – The mechanical properties of a plastic such as a load or weight carrying ability and ability to withstand sharp blows. Properties include tensile, flexural, and tear strength along with toughness and flexibility.

Tensile strength – The capacity of a material to resist a force tending to stretch it. Ordinarily the term is used to denote the force required to stretch a material to rupture and is known variously as “breaking load”, “breaking stress”, “ultimate tensile strength”, and sometimes erroneously as “breaking strain”. In plastics testing, it is the load in pounds per square inch or kilos per square centimeter of original cross-sectional area supported at the moment of rupture by a piece of test sample on being elongated.

Thermal conductivity – Capacity of a plastic material to conduct heat.

Thermal expansion – The increase in length of a dimension under the influence of a change in temperature.

Thermoplastic materials – Materials which soften when heated to normal processing temperatures without the occurrence of appreciable chemical change but are quickly hardened by cooling. Unlike the thermosetting materials they can be reheated to soften and retooled to “set” almost indefinitely; they may be formed and reformed many times by heat and pressure.

Vinyl chloride plastics – Plastics based on resins made by the polymerization of vinyl chloride or copolymerization of vinyl chloride with minor amounts (not over 50%) of other unsaturated compounds.

Vinyl plastics – Plastics based on resins made from vinyl monomers, except those specifically covered by other classifications such as acrylic and styrene plastics. Typical vinyl plastics are polyvinyl chloride, polyvinyl acetate, polyvinyl alcohol, polyvinyl butyral, and copolymers of vinyl monomers with unsaturated compounds.

Wet pipe system – A system employing nozzles attached to a piping system containing water and connected to a water supply so that water discharges immediately from the nozzles upon system activation.

Yield stress – The force which must be applied to a plastic to initiate flow

Chapter 1: Overview

Safety

Alerts

Several varieties of safety alerts and related messages appear in this manual. It is important to understand the meaning of the key words that identify each type of alert.

- **Warning** signifies hazards or unsafe practices that can cause severe personal injury or death if instructions, including recommended precautions, are not followed
- **Caution** signifies hazards or unsafe practices that can cause minor injury or product or property damage if instructions, including recommended precautions, are not followed.
- **Note** signifies important special instructions.

GF Building Flow Solutions provides this data as a courtesy. It is based on past experience, product testing, and other information believed to be reliable. This information is a recommendation only with no guarantee to its accuracy or suitability for particular applications.

General Safety Information

GF Building Flow Solutions recommends against the use of Uponor ChlorFIT for transport or storage of compressed air or gases. Remove entrapped air from liquid piping systems so that no air remains locked in the system when pressure is applied.

Also, avoid excessive surge pressure. Surge pressure can develop if liquid movement through the pipe is near maximum velocities and valves are closed abruptly. Refer to **Table 3-4** for recommended velocities based on system type.

Failures can occur at the joints connecting the pipe and fittings. For example, threaded joints have a diminished wall thickness because of the cut of the thread into the wall. Also, improperly cemented joints will leave the strength of the joint impaired.

Temperature extremes, both hot and cold, or changes in temperature can result in system failure.

- Avoid extreme cold weather temperatures. Impact from tools, vehicles, or rocks can result in breakage or other damage on the jobsite. Only solvent weld in the warmest hours of the day. Pipe and fitting surfaces must be **warmer than -15°F (-26°C)** prior to making connections. Be sure to keep primers and cements in warm areas above 40°F (4°C) prior to use.
- Avoid heat from chemical solutions or other sources, which can cause piping distortion.
- Wide variations in temperature when the pipe is restrained (e.g., in concrete) or anchored to a solid surface can lead to pipe cracking and breakage.
- Avoid excessive heat generation from equipment (e.g., pumps, boilers, etc.) as this can cause pipe or joints to fail.
- Expansion and contraction can cause leakage or breaks at joints.

Do not exceed the crush strength of the pipe and fittings. It is also important to avoid excessive suction or vacuum.

Do not use pipe wrenches on threaded connections.

Do not use pipes as a ground for electrical systems, and do not create conditions of static electricity through excessive friction. Welding or torch cutting near the pipe can cause damage due to burning by sparks or overheating.

Avoid high chromic acid solutions and high nitric acids, which can lead to stress cracking. Ensure no chemicals or solvents are absorbed into the pipe and fittings surfaces that will cause softness, leading to weeping or rupture.

Incompatible materials can cause cracks or fractures in CPVC. For chemical compatibility information, refer to **Chapter 2** of this manual or visit the **GF Online Chemical Resistance Tool** found at gfps.com/int/en/downloads-tools/online-tools/chemical-resistance.html.

Primers and Solvent Cements Safety

All solvent cements and primers for CPVC piping systems are flammable. Do not use or store near heat, spark, or open flame. Do not smoke during use. Store cement in closed containers at temperatures above 40°F (4°C). Only use in areas with adequate ventilation. In confined or partially enclosed areas, use a ventilating device to remove vapor and minimize inhalation.

If necessary, use commercially available respirators specially designed to minimize the inhalation of organic vapors. Keep containers tightly closed when not in use and keep them covered as much as possible when in use. It is helpful to use an application can with the applicator attached directly to the lid.

Avoid contact with skin and eyes as it may cause injury. In case of contact with eyes, flush with plenty of water for 15 minutes. If irritation persists, get medical attention. If swallowed, call a physician immediately and follow precautionary statements on the cement container. Keep out of reach of children.

Caution with Welding Torches

Flammable vapors from cemented CPVC joints can linger within or around a piping system for some time, so it is important to take special caution near welding torches or other equipment where sparks might be involved. In all cases, purge lines to remove solvent vapors before welding.

Caution Regarding Use with Compressed Air or Gas

Uponor ChlorFIT piping systems are considered rigid thermoplastic materials. GF Building Flow Solutions does not recommend the use of CPVC piping products for the testing, transport, or storage of compressed air or gases.

The compressibility of air and/or other gases result in tremendous amounts of stored energy, even at lower pressures.

Should a failure occur in a compressed air or gas system for any reason (i.e., improper assembly, mechanical damage, etc.) the failure mode will be dramatic in nature due to the physical characteristics of the rigid piping in combination with the immediate release of this stored energy.

Under these conditions, the velocity created by rapidly escaping air and the resultant failure mode can throw shards of CPVC in multiple directions. This scenario creates a substantial hazard to personnel and property within the vicinity of the piping should a failure occur.

Several cautionary statements and alerts against the use of rigid CPVC piping for use with compressed air or gases are available through the Plastic Pipe Institute (PPI), American Society for Testing and Materials (ASTM), various other trade organizations, manufacturers, safety codes, and several state and federal agencies.

Never use compressed air or other gases in testing. Use extreme care to assure complete venting of all entrapped air when filling the system with water or other liquids used in testing. Whether using a hydraulic hand pump or available water line pressure, any slow buildup of gauge pressure on a completely liquid-filled line shows some entrapped air in the system. Immediately release pressure and rebleed the line. Failure to do so can lead to catastrophic failure when the decompressing gas suddenly accelerates the solid water column if a faulty joint separates.

Do not use CPVC for compressed air lines. Improper installation, especially poor cementing techniques, can lead to an abrupt release of stored energy. This can result in shattering of pipe and fittings at directional changes and at points where the system is rigidly restrained due to the instantaneous "whipping" action imparted by the escaping air.

Using CPVC for compressed air lines can also initiate internal surface cracks due to stress, which can propagate and cause shattering, hairline cracks, or pinhole cracks over time. There is also evidence that certain additives to system lubricants will initiate internal stress cracking, which will lead to similar failure over extended periods of time.

Important Warranty Conditions and Exclusions

Note that in order for the Limited Warranty to be in effect, the applicable Uponor ChlorFIT products must be:

- Installed, operated, and used in conformance with all design, engineering, installation, operating and maintenance specifications, recommendations and instructions, including but not limited to those provided by GF Building Flow Solutions;
- Installed by a certified licensed plumbing contractor recognized by GF Building Flow Solutions as having successfully completed all training courses relevant to the product(s) at issue;
- Not exposed to water or operating conditions, including but not limited to temperature, pressure, and/or velocity, that exceed the limitations found in the specifications for the Uponor product;
- Installed in accordance with all applicable local plumbing and building codes;
- In their originally installed location;
- Installed in an end-use environment as intended for the product; and
- Installed in accordance with then-applicable building, mechanical, plumbing, electrical, or other applicable code requirements

In addition to the conditions above, the Limited Warranty does not apply when product failure or resulting damages are caused by:

- Exposure to temperatures, pressures, and/or velocities that exceed the limitations for the product;
- Faulty installation misalignment of products, vibration, corrosion, erosion, incompatible lubricants, pastes and thread sealants, unusual pressure surges or pulsation, water hammer, temperature shocking, or fouling;
- Misuse, tampering, mishandling, neglect, or accidental damage;
- Components not manufactured or sold by GF Building Flow Solutions;
- Exposure to ultraviolet (UV) light;
- External and internal physical or chemical conditions, including but not limited to chemicals in water;
- Abnormal operating conditions; or
- Modifications or repair unless previously approved in writing by an authorized GF Building Flow Solutions representative.

If replacement product is provided to a claimant under this Limited Warranty, the Term of Warranty for the replacement product shall run from the initial Commencement Date of the product which was replaced.

Defining CPVC

Chlorinated polyvinyl chloride (CPVC) is created by subjecting PVC resin to a post chlorination reaction that results in additional chlorine atoms on the base molecule. This creates an amorphous thermoplastic material similar to PVC with added advantages, including a higher heat distortion temperature and improved fire performance properties at relatively low cost compared to alternate materials.

As with PVC, the physical properties of CPVC can be altered considerably to provide desirable properties by compounding techniques. Due to its higher heat distortion temperature, Uponor ChlorFIT pipe can be used in piping applications up to 60°F (16°C) higher than PVC piping (depending on application).

Uponor ChlorFIT provides an economic solution for piping utilized in process piping, hot water, and similar service applications where operating conditions exceed the recommended temperature limits of PVC. This greatly expands the application range for thermoplastic pipe, providing an economical solution for piping used in elevated temperature service.

Uponor ChlorFIT materials are compliant with **NSF/ANSI Standard 61 Drinking Water System Components – Health Effects** and **NSF/ANSI Standard 14 Plastics Piping System Components** and Related Materials as being safe for use in potable-water applications.

Cell Classification

ASTM Standard D1784 **Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds** calls out minimum physical property requirements of compounds that are used in the production of PVC and CPVC pipe and fittings.

This standard classifies the physical properties through a cell classification system that calls out base resin, minimum impact strength, tensile strength, modulus of elasticity, heat deflection temperature under load, and flammability when tested per applicable ASTM standards.

CPVC unplasticized (i.e., rigid CPVC compounds) used for the manufacture of pipe and fittings has a Cell Classification of 23447 per ASTM D1784 and is also known as Type IV Grade I CPVC or CPVC 4120.

Note: Although PVC and CPVC are similar in nature, they are not the same. Use care when investigating chemical resistance, joining/fabrication techniques, and service applications. Different compounds may exhibit slight variations in actual physical properties and resultant cell classifications as compared to those stated. Contact GF Building Flow Solutions Technical Services for additional information, if necessary.

Material Properties

Mechanical

Properties	Unit	Corzan CPVC Value	ASTM Test
Density	lb./in.^{3}	0.0549 ± 0.0007	D-792
Tensile Strength at 73°F (23°C)	PSI	7,750	D-638
Modulus of Elasticity (E) at 73°F (23°C)	PSI	360,000	D-638
Compressive Strength (6) at 73°F (23°C)	PSI	10,000	D-695
Flexural Strength at 73°F (23°C)	PSI	13,000	D-790
Flexural Modulus at 73°F (23°C)	PSI	360,000	D-790
Izod Impact at 73°F (23°C)	ft.-lbs./in. of Notch	2.0	D-256
Relative Hardness at 73°F (23°C)	Rockwell "R"	117	D-785

Table 1-1: Mechanical properties

Thermodynamic

Properties	Unit	Corzan CPVC Value	ASTM Test
Coefficient of Thermal Linear Expansion (α)	in./in./°F	3.7×10^{-5}	D-696
Thermal Conductivity	BTU-in./hr.-ft.^{2}-°F	0.95	C-177
Maximum Operating Temperature	°F	200	200
Heat Deflection Temperature at 264 PSI (18 bar)	°F	226	D-648

Table 1-2: Thermodynamic properties

Other

Properties	Unit	Corzan CPVC Value	ASTM Test
Average Time of Burning	sec.	< 5	D-635
Average Extent of Burning	in.	< 0.4	D-635
Flame Spread		< 25	D-84
Flash Ignition	°F	900	
Smoke Generation		< 50	
Flammability (0.062 in., 1.57 mm)		V-0, 5VB, 5VA	UL-94
Softening Starts, approximately	°F	295	
Material Becomes Viscious	°F	395	
Material Carbonizes	°F	450	
Limiting Oxygen Index (LOI)	% Vol.	60	D-2863
Water Absorption	%	+0.03 @ 77°F	D-570
Poisson's Ratio at 73°F (23°C)		0.386	
ASTM Cell Classification		23447	D-1784
Color		Medium Gray	
NSF Potable Water Approved		Yes	

Table 1-3: Other properties

Design Considerations

Thermoplastics tend to be more sensitive to temperature than metallic piping. The below sections describe properties to consider when designing and installing Uponor ChlorFIT.

Ductility

Ductility is the ability of a solid material to deform under tensile stress. Thermoplastics have a relatively high ductility with respect to other materials at room temperature. When the temperature drops, ductility decreases; when the temperature rises, ductility increases. A material with low ductility is also considered to be brittle. A brittle material is more likely to fracture under stress.

Expansion and Contraction

Thermoplastics expand and contract significantly more than metals when temperature rises and drops, respectively. It is important to consider thermal expansion and contraction during the design process by incorporating expansion joints, expansion loops, and/or directional changes to compensate. Refer to **Chapter 3** for information about designing for temperature changes using expansion joints.

Cold Temperatures

Expansion and contraction affect both the transported fluid and the piping material. Water is one of the only substances that expands when frozen. When temperatures drop, pure water becomes its most dense at 39°F (4°C). As the temperature drops from 39°F to 32°F (4°C to 0°C), water expands. In a completely filled pipe, this expansion can cause the pipe to burst.

Important! Ensure Uponor ChlorFIT water piping systems do not freeze during operation or during downtime.

Though there are potential problems associated with below-freezing temperatures, given proper design, thermoplastics can be used in these temperatures. Due to the loss of ductility during colder temperatures, take care during installation to prevent significant pipe bending and avoid any impacts. Additionally, take protective measures to prevent accidental impacts after installation.

Benefits

There are many benefits to using thermoplastics over traditional metal piping in non-essential systems, including corrosion resistance, reduced cost, less heat loss, and lighter weights. The following sections highlight some of the major benefits.

Corrosion

Metallic piping systems are subject to the following types of damage.

- **Rusting:** The formation of iron oxide on iron or steel by oxidation, especially in the presence of moisture
- **Scaling:** A coating of oxide formed on heated metal
- **Pitting:** Localized corrosion confined to a point or small area that takes the form of cavities
- **Corrosion:** Deterioration due to oxides that flake away from the base metal
- **Electrolysis:** The process in which a metallic surface is continuously corroded by another metal it is in contact with

Uponor ChlorFIT products will not rust, scale, pit, or corrode, and they are not subject to electrolysis. This corrosion resistance also enables nonexposed indoor system installation without the need to paint the product for protection.

Installation Costs

Schedule 80 CPVC installation costs are substantially lower than metallic systems, and material costs are competitive. Using solvent-cemented connections along with the products' lighter weight helps speed and simplify installations, often reducing install times by half compared to metallics.

Heat Loss

Thermoplastics are less thermally conductive than their metal counterparts, which leads to less heat loss during service. This means less energy is consumed initially as the fluid retains its temperature for a longer period in thermoplastic piping.

Metal piping can also be required to have protection from condensation due to the surrounding environment. Condensation can cause metal piping to corrode and can cause damage to electrical equipment around the piping system. Special care is to be taken when metal piping is used in cold fluid service as this is when condensation is most likely to form. Thermoplastics do not require protection from condensation, which reduces both installation time and costs.

Weight

Schedule 80 CPVC is lightweight and easily transported during installation. The graph below shows the weight comparison between commonly used piping materials. Weight is a factor in some designs, and the weight savings in designing an entire system in thermoplastics is significant.

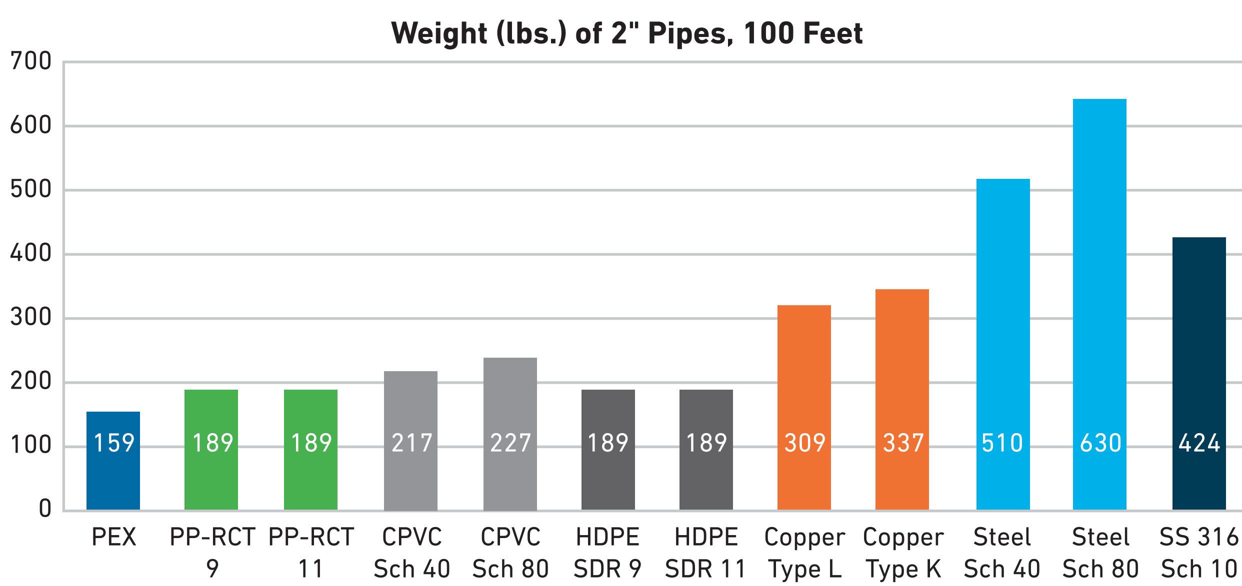


Figure 1-1: Weight comparison of various piping materials

Quality Control

GF Building Flow Solutions consistently provides the highest-quality products. While other manufacturers may consider CPVC materials commodities, GF Building Flow Solutions considers Uponor ChlorFIT a highly engineered fluid delivery system to satisfy demanding applications.

As such, the company provides rigorous attention to detail, material qualification, raw-material testing, and in-process quality assurance to maintain consistently high standards of quality. It starts with the right choice of raw materials, choosing the best suppliers, and verifying each shipment meets high standards to ensure quality control throughout the entire manufacturing process.

Extra care is also taken in packaging and protecting Uponor ChlorFIT products before leaving the manufacturing facility. This helps to ensure the product will arrive at the jobsite in the same excellent condition as when it left the plant.

Figure 1-2: Uponor ChlorFIT packaging

Raw Material Qualification Steps

Before processing any raw material, quality control checks batches for density and moisture content. Then, the product is separated by batch number to ensure there is no possibility of unintended blending of raw materials. In addition, the team compares raw material to control samples to check for inconsistent pellet size, pellet geometry, and contamination.

Once preliminary checks are complete, the resin is checked with a Brabender or torque rheometer that simulates the way the material will behave when processed through molding machines and extruders. If raw material is out of specification, it will be rejected.

Next, the resin is heated and pressed to flatten the material to under $\frac{1}{10}$" with several tons of pressure. This is used to check for correct color using a color platen. It is then analyzed using the color spectrometer. If the material's color is out of tolerance and does not meet specification, the material is rejected.

After the color check, the melt flow indexer measures the viscosity of the material and how it will behave in the molding and extrusion processes. If the material passes this final step, it can then be released to production.

Each batch of raw material is retained for five years. This provides traceability in case of a post-manufacturing material issue. Markings on a fitting or pipe allow traceability back to each batch of raw material used in production.

Samples of finished products are also retained on a regular basis. As with the raw material, if a problem is suspected, it can be compared to the retained sample to help confirm visual and dimensional conformance. Traceability is an integral part of the quality process.

In-Process Manufacturing Steps

A coordinate measurement machine (CMM) is an extremely precise measuring device that qualifies dimensional tolerances on finished products. In many cases, the GF Building Flow Solutions specifications are tighter than ASTM specifications. When making solvent cemented joints, a proper fit between pipe and fitting is important to ensure solid connections.

Fittings are routinely pressure tested to failure to ensure they meet or exceed ASTM standards. In addition to pressure tests, fittings are also tested under extreme forces to meet a 25% compression of the outer diameter for up to 6" fittings (15% for 8" to 12" fittings) to ensure they exceed ASTM standards.

All manufacturing processes are constantly monitored, recorded, and analyzed to produce products to the most exacting specifications. In most cases, the internal tolerance and safety factor requirement specifications are tighter than industry standards and ASTM tolerances.

Packaging and Handling

All of these efforts to produce the highest quality part would be lost unless they are delivered to customers in the same high-quality condition they were produced. Unlike other manufacturers, GF Building Flow Solutions wraps every lift of CPVC pipe in UV-resistant plastic and encloses pipe ends to arrive clean and free of scratches.

Applications

Uponor ChlorFIT piping systems are ideal in the following applications:

- Multifamily, hospitality, and education buildings
- New construction, renovation, and retrofit projects
- Hot and cold potable-water distribution
- Low-temperature hydronic piping
- Joined with Uponor AquaPEX® for a complete, hybrid polymer piping system

Chapter 2: Product Details

Dimensions

Pipe Dimensions for Uponor ChlorFIT Schedule 80 Corzan CPVC

Nominal Size (inch)	Outside Diameter	Average Inside Diameter	Minimum Wall	Nominal Weight Per Foot
½"	0.840	0.526	0.147	0.213
¾"	1.050	0.722	0.154	0.289
1"	1.315	0.936	0.179	0.424
1¼"	1.660	1.255	0.191	0.586
1½"	1.900	1.476	0.200	0.711
2"	2.375	1.913	0.218	0.984
2½"	2.875	2.290	0.276	1.500
3"	3.500	2.864	0.300	2.010
4"	4.500	3.786	0.337	2.938
6"	6.625	5.709	0.432	5.610
8"	8.625	7.565	0.500	8.522

Table 2-1: Pipe Dimensions

Industry Standards

ASTM Standard Specifications

- ASTM D2846 **Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems**
- ASTM D3139 **Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals**
- ASTM D6263 **Standard Specification for Extruded Rods and Bars Made From Rigid Poly(Vinyl Chloride) (PVC) and Chlorinated Poly(Vinyl Chloride) (CPVC)**
- ASTM F437 **Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80**
- ASTM F438 **Standard Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40**
- ASTM F439 **Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80**
- ASTM F441 **Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80**
- ASTM F442 **Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)**
- ASTM F477 **Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe**
- ASTM F493 **Standard Specification for Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings**
- ASTM F913 **Standard Specification for Thermoplastic Elastomeric Seals (Gaskets) for Joining Plastic Pipe**

ASTM Standard Test Methods

- ASTM D1598 **Standard Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure**
- ASTM D1599 **Standard Test Method for Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing, and Fittings**
- ASTM D2122 **Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings**
- ASTM D2412 **Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading**
- ASTM D2444 **Standard Test Method for Determination of the Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)**
- ASTM D2837 **Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products**

ASTM Standard Practices

- ASTM D2774 **Standard Practice for Underground Installation of Thermoplastic Pressure Piping**
- ASTM D2855 **Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride)(PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets**
- ASTM F402 **Standard Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings**
- ASTM F645 **Standard Guide for Selection, Design, and Installation of Thermoplastic Water-Pressure Piping Systems**

Toxicology

- NSF/ANSI Standard 61 **Drinking Water System Components – Health Effects**
- NSF/ANSI Standard 14 **Plastics Piping System Components and Related Materials**
- US FDA CFR Title 21 – **Food and Drugs**

Fire Performance

- ASTM D2863 **Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)**
- ASTM D635 **Standard Test Method for Rate of Buring and or Extent and Time of Burning of Plastics in a Horizontal Position**
- ASTM E84 **Standard Test Method for Surface Burning Characteristics of Building Materials**
- ASTM E162 **Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source**
- CAN/ULC-S102.2 **Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies**
- FM 1635 **Plastic Pipe and Fittings for Automatic Sprinkler Systems ANSI/FM 4910 American National Standard for Cleanroom Materials Flammability Test Protocol**
- UL 94 **Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances**
- UL 723 **Standard for Test for Surface Burning Characteristics of Building Materials**
- UL 1821 **Standard for Thermoplastic Sprinkler Pipe and Fittings for Fire Protection Service**
- UL 1887 **Standard for Fire Test of Plastic Sprinkler Pipe for Visible Flame and Smoke Characteristics**

Fire-Resistant Construction

ASTM E84 and CAN/ULC S102.2

Most commercial buildings have code requirements for materials that are installed in a return-air plenum. These requirements are in place to ensure that in the event of a fire, the return air in the HVAC system is not spreading the fire or the smoke throughout the building. These protocols are designed to evaluate how quickly the tested materials ignite and how much smoke is developed while it burns.

The test method commonly used is ASTM E84, **Standard Test Method for Surface Burning Characteristics of Building Materials** (interchangeable with UL 723). The testing method is used to evaluate piping materials when exposed to fire or ignition. The requirement is that materials need to be 25 for flame spread and 50 for smoke development, commonly referred to as 25/50. Products that have been tested and meet the 25/50 requirements fall into an acceptable level of risk and are suitable for installation.

Uponor ChlorFIT pipes and fittings are listed and labeled for installation and use in return-air plenums that meet the ASTM E84 requirement. In the Evaluation Service Report, PMG-1264, and as required by the International Mechanical Code (IMC) and Uniform Mechanical Code (UMC), Georg Fischer is listed for pipe sizes ½" to 6".

Note that ASTM E84 is the test standard in the United States. The Canadian equivalent is CAN/ULC-S102.2, which Uponor ChlorFIT products also meet.

ASTM E814 and CAN/ULC-S115

Combustible and noncombustible pipes penetrating a wall or a floor/ceiling fire-rated assembly must include a code-compliant means of passive fire protection. The function of a passive fire protection system, such as firestop, is to contain the fire within the area in which it started by preventing the products of combustion (smoke, hot gasses, and flames) from spreading throughout the structure.

Effective firestop requires accurate adherence to a specific combination of conditions that have been tested and listed as a system per ASTM E814, CAN/ULC-S115, or ANSI/UL 1479. Listed firestop components include the penetrated substrates, penetrating item, penetration hole, insulating materials, sealants, and installation method. Deviation from the listed fire assembly documentation severely compromises the effectiveness of the firestop system.

Fire assembly documentation and listings shall be obtained from the selected firestop solution manufacturer. Most of the firestop manufacturers have system selector tools or navigators on their websites to easily research and find a listing that matches the specified type of construction.

Firestop Solutions

There is a wide range of firestop solutions tested and listed with CPVC pipe, including intumescent caulks, wrap strips, pass-through devices, collars, and cast-in-place sleeves. Some firestop manufacturers include, but are not limited to, 3M™, Hilti®, RectorSeal®, Passive Fire Protection Partners, Specified Technologies Inc., HoldRite®, and ProSet Systems®.

The steps below show an example of how to research and find a listed firestop assembly.

Step 1

Choose a firestop solution manufacturer and consult their website or search the UL Product iQ™ directory for applicable listings (see **Figure 2-1**).

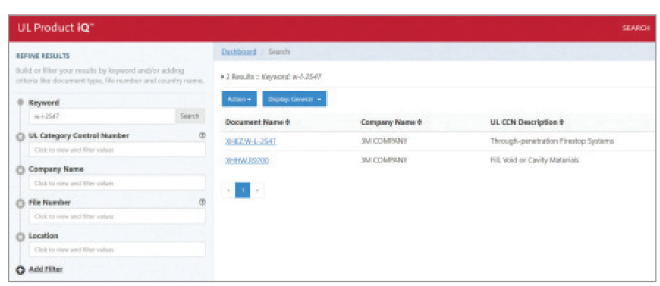


Figure 2-1: UL Product iQ Directory

Step 2

Select the desired and specified features of the through-penetration system. Defining the country of use, assembly type, penetrating item, firestop product, and F rating of the system may help refine search results (see **Figure 2-2**).

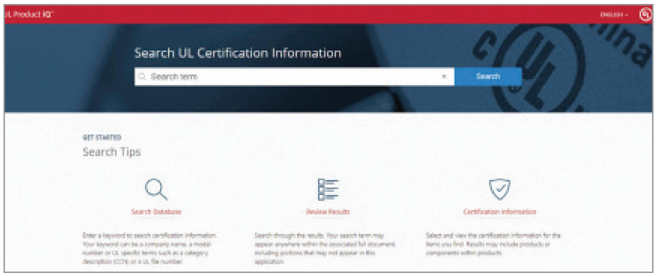


Figure 2-2: Search criteria

Step 3

Review the system matches for accuracy and consider all available options. Regarding fire listings for pressure pipe applications, domestic water piping (Division 22, Section 22 11 16) and hydronic piping (Division 23, Section 23 21 13) may be defined as being "closed" or "pressure" type systems. (Refer to the images in **Figure 2-3**.)

Step 4

Ensure the selected fire assembly document matches the following variables:

- Type of construction
- F rating of assembly (1-hr, 2-hr)
- Through penetrant defined as Chlorinated Polyvinyl Chloride (CPVC) Schedule 80 pipe
- Range of pipe size being installed
- Penetration hole size and shape
- Firestop solution availability

Note: Consider selecting a firestop product that can be used for other MEP system penetrations, such as drain, waste, and vent (DWV) and conduit applications. This can help ease coordination on the jobsite during the firestop installation.

Refer to the respective firestop manufacturer for more information pertaining to the appropriate application of their products. Read all information stated in the published listings to ensure compliance during installation.

Refer to **Figure 2-4** for an example of firestop assemblies. Note that these are only examples and are not meant to address every compatible firestop assembly or firestop manufacturer. Be sure to check all manufacturers' fire assembly information for detailed listings that meet the installation requirements to ensure it is approved and current for the specific application.

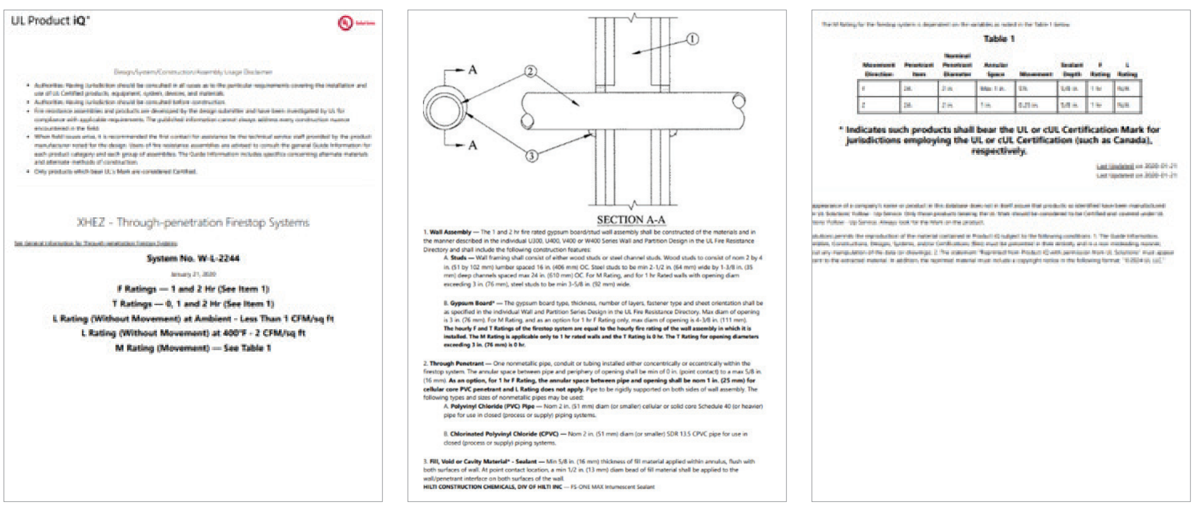


Figure 2-3: Fire assemblies

Assembly Types		Hilti Wall	Hilti Floor/Clg.	Max. Size
Wood Stud/Steel Stud Assemblies	1-Hour	W-L-2840		3"
		W-L-2842		4"
		W-L-2844		6"
			F-C-2231	2"
			F-C-2524	2"
			F-C-2526	2"
	2-Hour	W-L-2840		3"
		W-L-2842		4"
		W-L-2844		6"
Concrete	1-Hour	W-J-2396		3"
		W-J-2397		4"
			C-AJ-2835	18"
	2-Hour	W-J-2396		3"
		W-J-2399		6"
		W-J-2397		6"
			C-AJ-2305	6"
			C-AJ-2469	6"
			C-AJ-2835	18"
	3-Hour		C-AJ-2835	18"

U.S. Canada U.S. and Canada

Figure 2-4: Firestop assemblies examples

Chemical Compatibility

Occasionally, certain chemicals found in construction products and specific site preparations can cause damage to CPVC piping systems, including but not limited to thread sealants, lubricants, firestop materials, and others.

It is important to verify the compatibility of materials that come in contact with the piping system to promote long-term performance. For chemical resistance information, refer to the **GF Online Chemical Resistance Tool** found at gfps.com/int/en/downloads-tools/online-tools/chemical-resistance.html.

If chemical compatibility remains in question, GF Building Flow Solutions recommends isolating the suspect product from direct contact with the Uponor ChlorFIT piping system.

In general, CPVC materials may be more susceptible to stress cracking agents that can be found in certain ancillary products within or associated with the plumbing system. Refer to the following information for examples of the more common stress cracking agents.

Calcium Hypochlorite

Do not use a dry, granular calcium hypochlorite as a disinfecting material for water purification in potable water piping systems. The introduction of granules or pellets of calcium hypochlorite with solvent cements and primers, including their vapors, may result in violent chemical reactions if a water solution is not used. It is advisable to purify lines by pumping chlorinated water into the piping system; this solution will be nonvolatile. Furthermore, dry, granular calcium hypochlorite should not be stored or used near solvent cements or primers. Accidents and injuries have seldom occurred in the use of our products. Help maintain and improve this excellent record by following the above recommendations.

Thread Sealants

Some paste-type thread sealants contain solvents or other chemical additives that can cause damage to CPVC pipe and fittings. Only use compatible thread sealants and tapes.

Firestop Materials

Some firestop sealants contain solvents or other chemical additives that can cause damage to CPVC pipe and fittings. Only use compatible firestop materials. Refer to the **Firestop Solutions** section starting on **page 8** for further details.

Glycol/Antifreeze

Uponor ChlorFIT piping systems are suitable for use with propylene glycol solutions up to 35%, methanol solutions up to 10%, and ethylene glycol or glycerin solutions at any concentration. If higher percentages of propylene are required, contact GF Building Flow Solutions Technical Services at 888.594.7726 with system operating parameters (pressure, temperature, etc.) for evaluation. Always confirm the compatibility of other types of antifreeze or heat-transfer fluids with the manufacturer before using.

Soldering/Hot Work

Soldering of metallic components in close proximity to CPVC piping systems will cause damage to the system. Avoid direct contact with heat (open flame), solder, and soldering flux. Isolate these types of products from direct contact with CPVC piping products. Contact with solder flux can cause cracks, leaks, and breaks in the piping system. Remove and replace any CPVC pipe or fittings that have solder flux on them, as identified by staining or discoloration of the pipe and fittings.

Flexible Wire

Avoid direct contact with flexible wire and cable as the insulation for the wire and cable can contain plasticizers that can cause CPVC piping systems to crack, leak, or break. Inspect the finished installation to verify the CPVC piping system is not being used to support wire or cable and that runs of wire and cable have not been pulled over the installed CPVC system. Additionally, do not support CPVC piping systems with electrical cable or flexible wiring. Follow all hanger support recommendations.

Steel Pipe Transitions

Transitions from steel pipe to CPVC pipe are available via threaded, flanged, and grooved transition components. Occasionally, steel pipe may contain residual oils used to aid in the metal-cutting process. Some of these oils may be incompatible with CPVC materials. Remove any cutting oils from steel pipe prior to connecting to CPVC pipe. Fully clean the inside and outside of the pipe before assembling the system. Take care when selecting cleaning agents to avoid further contamination of the pipe with incompatible detergents. If cutting oil is used, consult with the manufacturer of the cutting oil for a specific recommendation as to compatibility with CPVC systems.

Paint

Oil-based or solvent-based paints may be chemically incompatible with CPVC materials, so it is important to use water-based acrylic or latex paint with CPVC pipe and fittings. The installing contractor must take responsibility for obtaining approval from the authority having jurisdiction (AHJ) to cover the markings on the product (i.e., product identification, listing marks, etc.) and to change the color of the pipe and fittings from its identifiable color prior to use.

Cooking Oils and Grease

When installing CPVC pipe and fittings in kitchen areas, protect the pipe from contact with grease or cooking oils. Certain cooking oils can cause CPVC pipe and fittings to crack, leak, or break. Protect the pipe and fittings from direct contact with cooking oils and/or grease, which includes airborne grease or oil from the environment. Protect exposed piping in areas where it might come in contact with cooking oils and/or grease by using a complete coating of high-quality, water-based paint that fully protects the piping system.

Rubber and Flexible Materials

CPVC pipe and fittings are typically not compatible with rubber and flexible plastic materials as these materials often contain certain types of plasticizers which, when placed in contact with CPVC, can cause the piping system to crack, leak, or break. Incompatible plasticizers include, but are not limited to, phthalates, adipates, trimellitates, and dibenzoates. Incompatible rubber and flexible plastic materials can be found in hoses and tank linings and in the fluids that come in contact with them.

Spray-on Coatings

Certain types of spray-on coatings that form a peelable film to protect fixtures during construction may be incompatible with CPVC. Take care to protect exposed piping from overspray when this type of protective coating is applied.

Termiticides and Insecticides

When performing installations where the presence of termiticides or insecticides is likely, take care to isolate the CPVC pipe and fittings from direct contact with large quantities of these chemicals. CPVC can be damaged when termiticides or insecticides are injected into the annular space between the pipe wall and sleeving material, trapping the termiticides or insecticides against the pipe wall. Termiticide and insecticide applications per label instructions in an open-air environment should not pose a problem. However, puddling of termiticides or insecticides on or near CPVC pipe and fittings may cause failures. In areas where puddling is more likely, take extra care to avoid this scenario. Before using a termiticide or insecticide, be sure to consult the manufacturers' installation guide for proper application instructions. For further details, refer to the **GF Online Chemical Resistance Tool** found at gfps.com/int/en/downloads-tools/online-tools/chemical-resistance.html.

Mold Abatement and Fungicides

Mold abatement and fungicide products can damage CPVC pipe and fittings by causing cracks, leaks, or breaks in the system. When performing repairs or modifications, take care to isolate the CPVC piping system from direct contact with these products. When repairs are made to an existing system and the possibility exists that fungicides will be applied to treat damp drywall and wood framing surrounding the repair site, sleeve exposed piping with a compatible plastic sleeving or pipe insulation material to prevent direct contact of the fungicide with the CPVC piping system.

Material Handling

Store Uponor ChlorFIT piping products indoors or outside in yards. If storing outdoors, protect from direct exposure to sunlight. Also, properly support pipe to prevent sagging or bending. Store on level ground in the manufacturer's packaging. Use caution to avoid compression, damage, or deformation. When stacking unit packages, ensure the weight of the upper units do not cause deformation to pipe in the lower units. Do not stack package units more than 8 feet high. Ensure the stack height does not result in instability, which can cause collapse, pipe damage, or personnel injury. Support unit packages with wooden racks or other suitable means and ensure proper spacing to prevent damage.

Do not store Uponor ChlorFIT piping products in tightly enclosed areas subject to elevated temperatures or close to heat-producing sources, such as heaters, boilers, steam lines, engine exhaust, etc. Exposure to excessive temperatures will result in distortion and deformation of the product.

When storing outdoors, cover the product with nontransparent material that provides adequate air circulation above and around the pipe to prevent excessive heat absorption that can result in discoloration and deformation of the product. Do not expose Uponor ChlorFIT piping products to temperatures above 200°F (93°C).

Do not drop Uponor ChlorFIT piping products, allow objects to drop on the product, or allow the product to be subjected to external loads. Do not drag the product across the ground or over obstacles, and do not allow damage from abrasion or gouging. Avoid rough handling, especially in cold weather. Be sure to inspect the product for any scratches, splits, or gouges that may have occurred from improper handling or storage. If found, remove damaged sections and discard.

Disclaimer of Liability

GF Building Flow Solutions does not assume liability for any use of Uponor ChlorFIT piping products with incompatible material as the conditions or methods of installation and use are beyond our control. The information, statements, and suggestions herein are made without warranty, express or implied, regarding their accuracy, the hazards connected with the use of the material, or the results to be obtained from the use thereof. Compliance with all applicable federal, state, and local laws and regulations remains the responsibility of the user.

Chapter 3: System Design and Engineering Data

Engineering Design

When engineering Uponor ChlorFIT piping systems, it is necessary to have a working knowledge of piping design along with an awareness of the unique properties of Schedule 80 CPVC.

Note: The equations in this section give a general idea as to the design of a piping system but do not substitute for the judgment of a licensed engineer.

In addition to chemical compatibility, important factors to consider in designing Uponor ChlorFIT piping systems include but are not limited to:

1. Pressure ratings
2. Water hammer
3. Temperature-UV relationships
4. Thermal expansion and contraction
5. Friction-loss characteristics

The following sections detail the basic theory and equations associated with each of these factors. Note that unless otherwise specified, all calculations assume an infinitely long pipe. If using a short pipe, the calculations may be significantly different. A short pipe varies in definition, but a good rule of thumb is L/D should be greater than 10-50 where L is the length of pipe and D is the outer diameter.

Pipe Dimensions

Nominal Size (inch)	Outside Diameter	Average Inside Diameter	Minimum Wall	Nominal Weight Per Foot
½"	0.840	0.526	0.147	0.213
¾"	1.050	0.722	0.154	0.289
1"	1.315	0.936	0.179	0.424
1¼"	1.660	1.255	0.191	0.586
1½"	1.900	1.476	0.200	0.711
2"	2.375	1.913	0.218	0.984
2½"	2.875	2.290	0.276	1.500
3"	3.500	2.864	0.300	2.010
4"	4.500	3.786	0.337	2.938
6"	6.625	5.709	0.432	5.610
8"	8.625	7.565	0.500	8.522

Table 3-1: Pipe dimensions

Pressure Effects

Determining Pressure-Stress Pipe Relationships

The circumferential stress resulting from internal pressure determines the pressure rating of a pipe. The pressure rating of a pipe represents the maximum allowable operating pressure within a piping system for water at 73°F (23°C).

The hydrostatic design basis (HDB) is an estimated long-term strength in the circumferential (hoop) direction. For CPVC, the HDB for long-term calculations is 4,000 PSI, and the equivalent short-term value is 6,400 PSI. ASTM requires a safety factor (SF) of 2 for long-term pressures and 3.2 for short-term pressures.

The pressure ratings for CPVC are listed below. The relationship between maximum allowable internal pressure, circumferential stress, wall thickness, and diameter is governed by the following equations.

Equation 3-1: Calculating Long-Term Pressure Rating

P = (1/SF) • [(2S)/((Do/t)-1)]

Where:

P = Internal pressure, PSI

S = Thermal stress at maximum temperature, PSI

t = Wall thickness, in

Do = Outside pipe diameter, in.

SF = Safety factor

Equation 3-1 Example

What is the long-term pressure rating of 1" Uponor ChlorFIT?

Long-Term Pressure Rating

S = 4,000 PSI

Do = 1.315"

t = 0.179"

SF = 2.0

$$P = \frac{1}{2.0} \cdot \frac{2 \cdot 4000 \text{ psi} \cdot 0.179 \text{ in.}}{1.315 \text{ in} - 0.179 \text{ in.}}$$

P = 630 PSI

Short-Term Pressure Rating

S = 6,400 PSI

Do = 1.315"

t = 0.179"

SF = 3.2

$$P = \frac{1}{2.0} \bullet \frac{2 \bullet 6400 \text{ psi} \bullet 0.179 \text{ in.}}{1.315 \text{ in.} - 0.179 \text{ in}}$$

P = 1,008 PSI

Pressure Ratings

The table below shows the maximum pressure rating results of **Equation 3-1** for Uponor ChlorFIT pipe sizes and schedules available from GF Building Flow Solutions.

Nominal Size (inch)	Schedule 80 Corzan CPVC	
	P (PSI)	P (bar)
½"	850	58.6
¾"	690	47.6
1"	630	43.4
1¼"	520	35.9
1½"	470	32.4
2"	400	27.6
2½"	420	29.0
3"	370	25.5
3½"	350	24.1
4"	320	22.1
5"	290	20.0
6"	280	19.3
8"	250	17.2

Table 3-2: Maximum pressure rating for Uponor ChlorFIT pipe at 73°F (23°C)

Negative Pressures

Critical collapse pressure is the maximum allowable pressure that can be applied externally to a pipe and is directly related to the wall thickness and diameter of the pipe selected. Examples of when external pressure conditions can occur are as follows:

1. When buried pipe is subjected to soil loads
2. Underwater applications
3. Vacuum service
4. Pipe installed on pump suction lines

The actual external load being applied to the pipe is the difference between the external pressure and the internal pressure which counteract each other. Thus, a pressurized pipe can withstand a greater external load than an empty pipe. As implied by the collapse rating, CPVC pipe is suitable for vacuum pressure conditions as well. The process for determining maximum vacuum pressures are the same as for external pressures as negative pressure inside the pipe is equivalent to positive pressure outside the pipe.

Note: Collapse pressure calculations are for static external pressures only. Dynamic factors are not considered and may cause additional stresses.

Equation 3-2: Calculating Critical Collapse Pressure

$$P_c = \frac{1}{SF} \bullet \frac{2 \bullet E}{(1 - v^2)(D_{ave}/t_{min})^3}$$

Where:

P_c = Critical collapse pressure, PSI

E = Modulus of elasticity, PSI

v = Poisson's ratio

D_{ave} = Average pipe diameter, in.

t_{min} = Minimum wall thickness, in.

SF = Safety factor

Example: What is the critical collapse pressure for 1" Schedule 80 CPVC pipe?

Equation 3-2 Example (no safety factor)

E = 420,000 PSI

D_{ave} = 1.136"

t_{min} = 0.179"

v = 0.41

SF = 1.0

D_{ave} = 1.315 – 0.179 = 1.136"

$$P_c = \frac{1}{1.0} \bullet \frac{2 \bullet 420{,}000 \text{ psi}}{(1 - 0.41^2)(1.136 \text{ in.}/0.179 \text{ in.})^3}$$

P_c **= 3,950 psi**

Equation 3-2 Example (safety factor = 3.0)

E = 420,000 PSI

D_{ave} = 1.136"

t_{min} = 0.179"

v = 0.41

SF = 3.0

D_{ave} = 1.315 – 0.179 = 1.136"

$$P_c = \frac{1}{3.0} \bullet \frac{2 \bullet 420{,}000 \text{ psi}}{(1 - 0.41^2)(1.136 \text{ in.}/0.179 \text{ in.})^3}$$

P_c **= 1,316 psi**

Short-Term Collapse Pressure for Available Sizes of Schedule 80 Corzan CPVC Pipe at 73°F (23°C)

Nominal Size (inch)	Schedule 80 Corzan CPVC	
	P (PSI)	P (bar)
½"	8,075	556.8
¾"	4,296	296.2
1"	3,310	228.2
1¼"	1,860	128.2
1½"	1,378	95.0
2"	873	60.2
2½"	1,013	69.9
3"	697	48.1
4"	449	30.9
6"	287	19.8
8"	197	13.6

Table 3-3: Short-term collapse pressure

Surge Pressure (Water Hammer)

Surge pressure, or water hammer, is a term used to describe dynamic surges caused by pressure changes in a piping system. They occur whenever there is a deviation from the steady state (i.e., when the velocity of the fluid is increased or decreased) and may be transient or oscillating.

Waves of positive or negative pressure may be generated by any of the following:

- Opening or closing of a valve
- Pump startup or shutdown
- Change in pump or turbine speed
- Wave action in a feed tank
- Entrapped air

The pressure waves travel along at speeds limited by the speed of sound in the medium, causing the pipe to expand and contract. The energy carried by the wave is dissipated and the waves are progressively damped (see figure below). The pressure excess to water hammer must be considered in addition to the hydrostatic load, and this total pressure must be sustainable by the piping system. In the case of oscillatory surge pressures, extreme caution is needed as surging at the harmonic frequency of the system could lead to catastrophic damage.

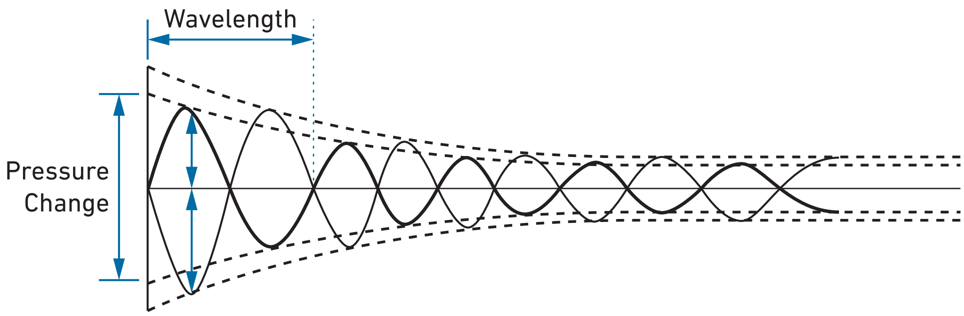


Figure 3-1: Pressure waves

The maximum positive or negative addition of pressure due to surging is a function of fluid velocity, fluid density, bulk fluid density and pipe dimensions of the piping system. It can be calculated using the following steps.

Step 1: Determine the velocity of the pressure wave in pipes

v_w = Velocity of pressure wave (ft./sec.)

K = Bulk modulus of elasticity of fluid (PSI)

ρ = Fluid density (slugs/ft.^{3})

n_i = Conversion factor 1⁄144 (ft.^{2} /in.^{2})

E = Modulus of Elasticity, PSI

d_i = Pipe inner diameter (inch)

e = Pipe wall thickness (inch)

$$V_w = \sqrt{\frac{K}{\rho \times n_i (1 + \frac{K \times d_i}{e \times E})}}$$

Step 2: Calculate critical time for valve closure

t_c = Time for Valve Closure (sec.)

V_w = Velocity of Pressure Wave (ft./sec.)

L = Length of pipe, ft.

$$t_c = \frac{2L}{V_w}$$

Step 3: Maximum pressure increase; assume valve closure time is less than the critical closure time and fluid velocity goes to 0.

P_i = Maximum Total Pressure (lb./in.^{2})

δ = Fluid Density (slugs/ft.^{3}) V = Fluid Velocity (ft./sec.)

V_w = Velocity of Pressure Wave

n_i = Conversion Factor 1⁄144 (ft.^{2} /in.^{2})

$$P_i = \delta \bullet V \bullet V_w \bullet n_i$$

Special Consideration: Calculate the Maximum Instantaneous System Pressure

P_{max} = Maximum System Operating Pressure (lb./in.^{2})

P_i = Maximum Pressure Increase (lb./in.^{2})

P_s = Standard System Operating Pressure (lb./in.^{2})

$$P_{max} = P_i + P_s$$

Cautionary Note

If P_{max} is greater than the maximum system design pressure multiplied by a safety factor of 2x (for example, the pipe is rated at 150 PSI and P_{max} exceeds 300 PSI, which is 150 PSI x 2 safety factor), then implement precaution in case of maximum pressure wave (i.e., water hammer) to prevent possible pipe failure.

Step 4: Determine the Maximum System Pressure Increase with Gradual Valve Closure.

P_g = Gradual Pressure Increase with Valve Closure (lb./in.^{2})

L = Length of pipe, ft.

V = Fluid Velocity (ft./sec.)

n_i = Conversion Factor 1⁄144 (ft.^{2} /in.^{2})

t_v = Time of Valve Closure (sec.)

$$P_g = \frac{2 \bullet \delta \bullet L \bullet V \bullet n_i}{t_v}$$

Maximum Operating Conditions Based on System Type

System Type	Temperature	Pressure	Velocity
Water service piping	See **Table 3-6**		8 ft./sec.
Domestic cold-water piping			8 ft./sec.
Domestic hot-water piping			5 ft./sec.
Domestic hot-water recirculation piping (dedicated)			5 ft./sec.
Heating hot-water piping			5 ft./sec.
Chilled-water piping			8 ft./sec.

Table 3-4: Maximum operating conditions based on system type

Velocity

Schedule 80 CPVC piping has been successfully installed in systems with water velocities up to 8 ft./sec. for cold water and 5 ft./sec. for hot water (see **Table 3-4** for details). The pipe is not subject to erosion caused by high velocities and turbulent flow and is superior to metal piping systems in this regard, particularly where corrosive or chemically aggressive fluids are involved. It is important that the total pressure in the system at any time (operating plus surge or water hammer) not exceed 150% of the pressure rating for the system. If higher design velocities are required, contact GF Building Flow Solutions Technical Services at Support.UNA@georgfischer.com with operating parameters for evaluation.

Entrapped Air

Systems can develop entrapped air where the fluid enters the system, during the initial filling of the system, through mechanical air releases when the system pressure drops below atmospheric pressure, or from dissolved air in water during large temperature or pressure changes within the system.

The entrapped air accumulates at the local high points in the system. This causes a restriction in flow area, causing a larger liquid velocity. The liquid velocity then moves the air packets along the system to an outlet. When the air pocket reaches the outlet, the increased air pressure forces the air out at a high velocity and is then followed by a surge of the transported medium. This causes the equivalent of water hammer and can cause the system to fail. To reduce entrapped air effects, fill the system slowly with a fluid velocity of less than 1 ft./sec. and vent air from high points.

Cyclic Fatigue

A piping system that has frequent and significant changes in flow conditions or pressure, creating a fluctuating surge, can affect the structural integrity of a CPVC fitting. This condition has been observed in golf course irrigation systems that experience tens of thousands of water pressure surges over the course of a year. The resultant failure from cyclic fatigue is very similar in appearance to long-term static failure, and it may be very difficult to ascertain the exact cause of such failures.

The design engineer should consider this phenomenon when designing a CPVC piping system with frequent pressure changes, particularly if the surge pressure exceeds 17.5% of the system's working pressure. Based on testing by Keller-Bliesner Engineering, the engineer may want to consider devaluing the fitting by 40% from the published pipe burst pressure. Keeping the flow velocity to 5 ft./sec. or less will also reduce pressure surges. Other considerations would be to use actuated valves that can be set to provide a slow opening or to install soft-start pumps as both will limit the water hammer and the resultant pressure surges.

Temperature Effects

Temperature Derating

The pressure ratings given are for water, non-shock, at 73°F (23°C). The following temperature derating factors are to be applied to the working pressure ratings (W.P.) listed when operating at elevated temperatures.

Multiply the working pressure rating of the selected pipe at 73°F (23°C) by the appropriate derating factor to determine the maximum working pressure rating of the pipe at the elevated temperature chosen. Use solvent-cemented joints when working at or near maximum temperatures of the material selected.

GF Building Flow Solutions does not recommend the use of standard threaded connections at temperatures above 150°F (66°C) for CPVC. Instead, use flanged joints or unions where disassembly is necessary at elevated temperatures.

Threading of Schedule 80 CPVC is allowable. Threading requires a 50% reduction in pressure rating stated for plain end pipe at 73°F (23°C). It is important to reference chemical resistance data for proper material selection and possible pressure derating when working with fluids other than water. See **Table 3-7** for the derating factors for systems with plastic threaded connections based on pipe size for a specific operating temperature.

For chemical resistance information, refer to **Chapter 2** of this manual or the **GF Online Chemical Resistance Tool** found at gfps.com/int/en/downloads-tools/online-tools/chemical-resistance.html.

Temperature Derating Factors

Operating Temperature (°F)	Derating Factor
73 - 80	1.00
90	0.91
100	0.82
110	0.72
120	0.65
130	0.57
140	0.50
150	0.42
160	0.40
180	0.25
200	0.20

Table 3-5: Temperature derating factors

Ex: 6" CPVC sch 80 at 120°F

280 PSI × 0.65 = 182 PSI max. at 120°F

Equation 3-3: Calculating Operating Temperature

$$P_{OT} = P_{73°F} \bullet f$$

Where:

P_{OT} = Pressure at the operating temperature, PSI (bar)

$P_{73°F}$ = Pressure at room temperature, PSI (bar)

f = Derating factor

Table 3-6 shows the derated pressure ratings based on temperature for the full range of Uponor ChlorFIT piping sizes.

Derated Pressure Ratings Based on Temperature

	Temperature (°F)										
	<74	90	100	110	120	130	140	150	160	180	200
	Derating Factor										
Pipe Size	**1**	**0.91**	**0.82**	**0.72**	**0.65**	**0.57**	**0.5**	**0.42**	**0.4**	**0.25**	**0.2**
½"	850	773.5	697	612	552.5	484.5	425	357	340	212.5	170
¾"	690	627.9	565.8	496.8	448.5	393.3	345	289.8	276	172.5	138
1"	630	573.3	516.6	453.6	409.5	359.1	315	264.6	252	157.5	126
1¼"	520	473.2	426.4	374.4	338	296.4	260	218.4	208	130	104
1½"	470	427.7	385.4	338.4	305.5	267.9	235	197.4	188	117.5	94
2"	400	364	328	288	260	228	200	168	160	100	80
2½"	420	382.2	344.4	302.4	273	239.4	210	176.4	168	105	84
3"	370	336.7	303.4	266.4	240.5	210.9	185	155.4	148	92.5	74
4"	320	291.2	262.4	230.4	208	182.4	160	134.4	128	80	64
6"	290	253.9	237.8	208.8	188.5	165.3	145	121.8	116	72.5	58
8"	250	227.5	205	180	162.5	142.5	125	105	100	62.5	50
10"	230	209.3	188.6	165.6	149.5	131.1	115	96.6	92	57.5	46
12"	230	209.3	188.6	165.6	149.5	131.1	115	96.6	92	57.5	46

Table 3-6: Uponor ChlorFIT derated pressure ratings based on temperature

Important: Threading is approved for Schedule 80 Corzan CPVC or heavier walls. Using plastic threads will reduce the stated pressure rating by 50%. (See **Table 3-7**.)

Derated Pressure Ratings Based on Temperature for Plastic Threaded Fittings

	Temperature (°F)										
	<74	90	100	110	120	130	140	150	160	180	200
½"	425	386.8	348.5	306.0	276.3	242.3	212.5	178.5	170	106.3	85
¾"	345	314	282.9	248.4	224.3	196.7	172.5	144.9	138	86.3	69
1"	315	286.7	258.3	226.8	204.8	179.6	157.5	132.3	126	78.8	63
1¼"	260	236.6	213.2	187.2	169.0	148.2	130	109.2	104	65	52
1½"	235	213.9	192.7	169.2	152.8	134.0	117.5	98.7	94	58.8	47
2"	200	182	164	144	130	114	100	84	80	50	40
2½"	210	191.1	172.2	151.2	136.5	119.7	105	88.2	84	52.5	42
3"	185	168.4	151.7	133.2	120.3	105.5	92.5	77.7	74	46.3	37
4"	160	145.6	131.2	115.2	104	91.2	80	67.2	64	40	32
6"	145	132	118.9	104.4	94.3	82.7	72.5	60.9	58	36.3	29
8"	125	113.8	102.5	90	81.3	71.3	62.5	52.5	50	31.3	25
10"	115	104.7	94.3	82.8	74.8	65.6	57.5	48.3	46	28.8	23
12"	115	104.7	94.3	82.8	74.8	65.6	57.5	48.3	46	28.8	23

Table 3-7: Uponor ChlorFIT derated pressure ratings based on temperature for plastic threaded fittings

Exceeds recommendation for threaded fittings

Use solvent-cemented joints when working at or near maximum temperatures of the material. GF Building Flow Solutions does not recommend using standard threaded connections at temperatures above 150°F (49°C) for CPVC. Use specialty reinforced adapters, flanged joints, unions, or roll-grooved couplings where service is necessary at elevated temperatures.

Threading is approved for Schedule 80 CPVC or heavier walls. Threading requires a 50% reduction in pressure rating stated for plain-end pipe at 73°F (23°C).

Note: Reference chemical resistance data for proper material selection and possible pressure derating when working with fluids other than water. Refer to the **GF Online Chemical Resistance Tool** found at gfps.com/int/en/downloads-tools/online-tools/chemical-resistance.html for additional information.

Thermal Expansion and Contraction

All piping systems expand and contract with changes in temperature. CPVC materials exhibit a relatively high coefficient of thermal expansion that can be as much as ten times that of steel. The issue must be addressed with appropriate system design to prevent damage to the piping system.

The degree of movement (change in length) generated as the result of temperature changes must be calculated based on the type of piping material and the anticipated temperature changes of the system. The rate of expansion does not vary with pipe size. In many cases this movement must then be compensated for by the construction of appropriately sized expansion loops, offsets, or bends or the installation of expansion joints.

If designed improperly, expansion and contraction can cause unnecessary bending stresses in the piping system. The above-described methods to control expansion are intended to absorb the stresses generated from the movement, thereby minimizing damage to the piping. The effects of thermal expansion and contraction must be considered during the design phase, particularly for systems involving long runs, hot water lines, hot drain lines, and piping systems exposed to environmental temperature extremes (i.e. summer to winter).

Use **Equation 3-4** along with **Table 3-8** to evaluate thermal expansion.

Calculating Linear Movement Caused by Thermal Expansion

The rate of movement (change in length) caused by thermal expansion or contraction can be calculated as follows:

Equation 3-4: Calculating Linear Expansion

ΔL = 12 • y • l • (ΔT)

Where:

ΔL = Linear expansion or contraction in inches

y = Coefficient of thermal expansion, in./in.-°F

L = Length of pipe, ft.

ΔT = (T1-T2) temperature change °F

T1= maximum service temperature of system

T2 = temperature at time of installation (or difference between lowest system temperature and maximum system temperature – whichever is greatest)

Equation 3-4 Example

Example 1: Calculate the change in length for a 100 Feet straight run of 2" Schedule 80 PVC pipe operating at a temperature of 140°F; installed at 70°F.

ΔL = 12 • y • l • (ΔT)

Where:

ΔL = Linear expansion or contraction in inches

y = 3.7 x 10^{-5} in./in./°F

l = 100 ft.

ΔT = 50°F (120°F – 70°F)

ΔL = 12 in./ft. • 0.000037 in./in./ft. • 100 ft. • 50°F

ΔL = 2.2"

In this example the piping would expand 2.2" in length over a 100 ft. straight run once the operating temperature of 120°F was obtained.

Note: Per ASTM D696, the linear coefficient of Schedule 80 CPVC is 3.7 x 10^{-5} in./in./°F.

Thermal Expansion of Schedule 80 Corzan CPVC

Change in Temp. (F)	Length of Pipe (ft.)																	
	10	20	30	40	50	60	70	80	90	100	125	150	175	200	250	300	350	400
10	0.04	0.09	0.13	0.18	0.22	0.27	0.31	0.36	0.40	0.44	0.56	0.67	0.78	0.89	1.11	1.33	1.55	1.78
20	0.09	0.18	0.27	0.36	0.44	0.53	0.62	0.71	0.80	0.89	1.11	1.33	1.55	1.78	2.22	2.66	3.11	3.55
30	0.13	0.27	0.40	0.53	0.67	0.80	0.93	1.07	1.20	1.33	1.67	2.00	2.33	2.66	3.33	4.00	4.66	5.33
40	0.18	0.36	0.53	0.71	0.89	1.07	1.24	1.42	1.60	1.78	2.22	2.26	3.11	3.55	4.44	5.33	6.22	7.10
50	0.22	0.44	0.67	0.89	1.11	1.33	1.55	1.78	2.00	2.22	2.78	3.33	3.89	4.44	5.55	6.66	7.77	8.88
60	0.27	0.53	0.80	1.07	1.33	1.60	1.86	2.13	2.40	2.66	3.33	4.00	4.66	5.33	6.66	7.99	9.32	10.66
70	0.31	0.62	0.93	1.24	1.55	1.86	2.18	2.49	2.80	3.11	3.89	4.66	5.44	6.22	7.77	9.32	10.88	12.43
80	0.36	0.71	1.07	1.42	1.78	2.13	2.49	2.84	3.20	3.55	4.44	5.33	6.22	7.10	8.88	10.66	12.43	14.21
90	0.40	0.80	1.20	1.60	2.00	2.40	2.80	3.20	3.60	4.00	5.00	5.99	6.99	7.99	9.99	11.99	13.99	15.98
100	0.44	0.89	1.33	1.78	2.22	2.66	3.11	3.55	4.00	4.44	5.55	6.66	7.77	8.88	11.10	13.32	15.54	17.76

Table 3-8: Thermal expansion of Schedule 80 Corzan CPVC

Expansion Control

In most piping applications, the effects of thermal expansion/contraction are usually absorbed by the system in changes of direction in the piping. However, long, straight runs of piping are more susceptible to experiencing measurable movement with changes in temperature.

Thermal Stress

Compressive stress is generated in piping that is restrained from expanding in cases where the effects of thermal expansion are not addressed. This induced stress can damage the piping system leading to premature failure and in some cases also cause damage to hangers, supports, or other structural members.

The amount of compressive stress generated is dependent on the pipe material, coefficient of thermal expansion, and tensile modulus and can be determined by the following equation:

Equation 3-5: Calculating Thermal Stress

$$S = E \bullet \alpha \bullet \Delta T$$

Where:

S = Thermal stress at maximum temperature, PSI

E = Modulus of Elasticity, PSI

α = Coefficient of thermal expansion, in./in.-°F

ΔT = Maximum change in temperature between installation and operation, °F

Equation 3-5 Example

What is the thermal stress of a 1" Schedule 80 CPVC pipe installed at 80°F and operating at 180°F?

E = 420,00 PSI

ΔT = 140 °F - 80 °F = 60 °F

y = 3.7×10^{-5} in./in.-°F

S = 420,000 PSI • 3.7×10^{-5} in./in.-°F • 60 °F

S = 932.4 PSI

The stress induced in the pipe as a result of thermal influences must not exceed the maximum allowable working stress of the pipe material. The maximum allowable working stress (fiber stress) is dependent on the temperature the pipe is exposed to. Increases in temperature will reduce the allowable stress as shown in **Table 3-9**.

Maximum Allowable Working (Fiber) Stress and Tensile Modulus at Various Temperatures for Corzan CPVC

Temperature (°F)	Temperature (°C)	Maximum Allowable Working (Fiber) Stress (PSI)	Maximum Allowable Working (Fiber) Stress (MPa)	Tensile Modules of Elasticity (PSI)	Tensile Modules of Elasticity (MPa)
73	23	2,000	13.79	420,000	2,896
80	27	1,760	12.14	369,000	2,548
90	32	1,500	10.34	315,000	2,172
100	38	1,240	8.55	260,400	1,796
110	43	1,020	7.03	214,200	1,477
120	49	800	5.52	168,000	1,158
130	54	620	4.27	130,200	898
140	60	440	3.03	92,400	637

Table 3-9: Maximum allowable working (fiber) stress and tensile modulus

Compensating for Movement Caused by Thermal Expansion and Contraction

As with other piping materials, the installation of expansion joints, expansion loops or offsets is required on long, straight runs. This will allow the piping system to absorb the forces generated by expansion and contraction without damage. Refer to **Figure 3-2** for examples.

Expansion Loop, Offset, and Change in Direction Examples

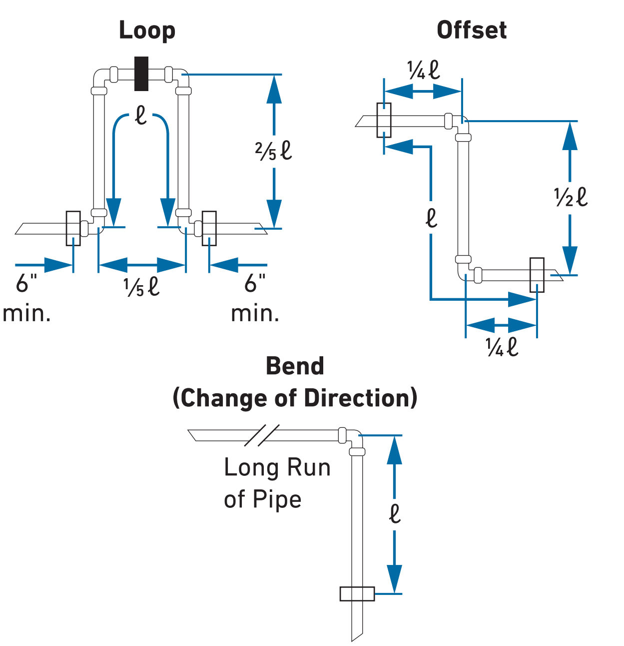


Figure 3-2: Expansion loop, offset, and change in direction examples

After determining the change in length (ΔL), calculate the length of an offset, expansion loop, or bend required to compensate for this change:

Equation 3-6: Calculating Expansion Length

$$\ell = \sqrt{\frac{3 \cdot E \cdot D_{ave} \cdot \Delta L}{2 \cdot S}}$$

Where:

ℓ = Compensated expansion length, in.

E = Modulus of elasticity, PSI

D_{avg} = Average outside diameter of pipe, in.

ΔL = Change in length of pipe due to temperature change, in.

S = Thermal stress at maximum temperature, PSI

Equation 3-6 Example

What is the minimum sizing of an expansion loop for 1" Schedule 80 CPVC pipe installed at 80°F and operating at 180°F, and with a ΔL of 4"?

E = 360,000 PSI

D_{avg} = 1.136 in.

ΔL = 4"

S = 500 PSI

$$\ell = \sqrt{\frac{3 \cdot 360{,}000 \text{ psi} \cdot 1.136 \text{ in.} \cdot 4 \text{ in.}}{2 \cdot 500 \text{ psi}}}$$

ℓ = 70"
⅖ ℓ = 28"
⅕ ℓ = 14"

Only place hangers or guides in the loop, offset, or change of direction as indicated above. Ensure they do not compress or restrict the pipe from axial movement. Piping supports should restrict lateral movement and should direct axial movement into the expansion loop configuration.

Do not restrain change in direction configurations by butting up against joists, studs, walls, or other structures. Use only solvent-cemented connections on straight pipe lengths, in combination with 90-degree elbows, to construct the expansion loop, offset, or bend. **DO NOT** use threaded components to construct the loop configuration.

Install expansion loops, offsets, and bends as nearly as possible to the midpoint between anchors. Do not install concentrated loads, such as valves, in the developed length. Ensure calculated support guide spacing distances for offsets and bends do not exceed recommended hanger support spacing for the maximum anticipated temperature. If this occurs, reduce the distance between anchors until the support guide spacing distance is less than or equal to the maximum recommended support spacing distance for the appropriate pipe size at the temperature used. Ensure all valve support does not restrict movement.

Expansion Joints

Expansion joints are necessary when standard expansion loops are not practical or desired. Expansion joints allow for rigid mounting between two fixed points with the inner pipe expanding and contracting, like a piston, against the anchored outer pipe.

Expansion joints are an effective means of designing for expansion or contraction and should be the preferred consideration when:

- The system has critical dimensions with no room for movement (i.e. manifold systems).
- The system has significant space constraints (i.e., containment piping systems).
- The system will experience frequent thermal cycling.
- The system will be exposed to a temperature change beyond 30°F (-1°C).
- Physical appearance is critical.

Typically, expansion joints are not necessary indoors unless the temperature of the air and/or liquid is going to vary. Outdoor installations need to consider expansion and contraction. The amount of expansion is based on the temperature differential between the minimum and maximum of the air and/or liquid.

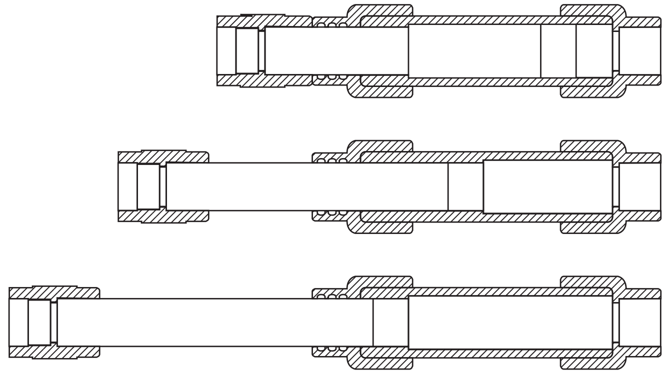


Figure 3-3: Piston position for expansion joint (fully compressed on top; fully extended on bottom)

Table 3-10 shows the pressure ratings of expansion joints depending on pipe diameter and temperature. **Equation 3-7** will assist in the determination of piston position during installation.

Note: The thermal expansion in the following equation is used to determine the minimum piston length.

Caution: Do not test with air or air over water.

Max. Pressure	73°F	120°F	140°F	160°F	180°F	23°C	49°C	60°C	71°C	82°C
½"	340	275	215	170	110	23.4	19.0	14.8	11.7	7.6
¾"	340	225	170	135	85	23.4	15.5	11.7	9.3	5.9
1"	320	205	160	125	80	22.1	14.1	11.0	8.6	5.5
1¼"	260	170	130	105	65	17.9	11.7	9.0	7.2	4.5
1½"	240	150	120	95	60	16.5	10.3	8.3	6.6	4.1
2"	200	130	100	80	50	13.8	9.0	6.9	5.5	3.4
3"	190	125	95	75	50	13.1	8.6	6.6	5.2	3.4
4"	160	105	80	65	40	11.0	7.2	5.5	4.5	2.8
6"	130	90	70	50	36	9.0	6.2	4.8	3.4	2.5
8"	130	90	70	50	36	9.0	6.2	4.8	3.4	2.5
10"	130	90	70	50	36	9.0	6.2	4.8	3.4	2.5

Table 3-10: Expansion joint pressure ratings for Uponor ChlorFIT

Equation 3-7: Calculating the Piston Length for Expansion Joints

$$P_x = \frac{T_{max} - T_{amb}}{T_{max} - T_{min}} \cdot \triangle X$$

Where:

P_x = Piston position at time of installation, in.

T_{max} = Temperature maximum, °F

T_{amb} = Temperature ambient, °F (installation temperature)

T_{min} = Temperature minimum, °F

ΔL = Change in length of pipe due to temperature change, in.

Δx = Piston length, in.

Equation 3-7 Example

What is the required piston length and installation position of a 1" Schedule 80 CPVC expansion joint when the ambient temperature is 60°F, maximum temperature is 90°F, and the minimum temperature is 50°F? The pipe run is 300 feet long.

T_{min} = 50°F

T_{max} = 90°F

T_{amb} = 60°F

L = 300 ft. × 12in./ft. = 3600 in.

y = 3.7 × 10^{-5}in./in.–°F

ΔT = 90°F – 50°F = 40°F

ΔL = (3.7 × 10^{-5} in./in.–°F) • (3600 in.) • (40°F)

ΔL = 5.3 in. > Δx = 6 in.

$$P_x = \frac{90 - 60}{90 - 50} \cdot 6$$

P_x = 4.5 in.

Thermal Conductivity

One of the benefits to using CPVC piping is its ability to act as a thermal insulator. The heat transfer coefficient, a constant describing the ability of a material to transfer heat, is significantly lower than that of metal piping. This reduces the condensation production on the outside of the piping as condensation can cause issues with electrical equipment, cause corrosion, and present a safety hazard. A lower heat transfer coefficient also allows the transported fluid to retain heat, or lack thereof, leading to smaller temperature changes throughout the system. **Equation 3-8** demonstrates the calculations for heat flux.

$$q = \frac{2 \cdot \pi \cdot k \cdot L \cdot \triangle T}{\ell n\,(D_o/D_i)}$$

Where:

q = Heat gain/heat loss (negative values = heat loss), BTU/hr.

k = Thermal conductivity of pipe, BTU/hr.°F • ft.

L = Length of pipe, ft.

D_o = Outside diameter, in.

D_i = Inside diameter, in.

T_{amb} = Temperature ambient, °F

T_i = Temperature fluid, °F

ΔT = T_{amb} - T_i , °F

ℓn(x) = Natural Log of x

Equation 3-8: Calculating Heat Gain (Loss)

What is the heat gain (loss) of a 1" Schedule 80 CPVC pipe, 100 ft. long, where the fluid temperature is 180°F and the ambient temperature is 75°F?

L = 100 ft.

D_o = 1.315 in.

D_i = 0.957 in.

T_{amb} = 75°F

T_i = 180°F

ΔT = 75°F - 180°F = -105°F

k = 0.079 BTU/hr.°F ft.

$$q = \frac{2 \cdot \pi \cdot 0.79 \text{ BTU/hr.°F ft.} \cdot 100 \text{ ft.} \cdot -105\text{°F}}{\ell n\,(1.315 \text{ in.}/0.957 \text{ in.})}$$

q = -16,400 BTU/hr. (heat loss)

Thermal conductivity coefficients are listed in **Table 3-11**. **Equation 3-8** is to be used as a general estimate of heat flux. More complicated systems will also need to evaluate heat flux based on:

- A more accurate heat transfer coefficient
- Fluid conductivity
- Fluid heat capacity
- Viscosity
- Air temperature
- Air velocity

Coefficients of Thermal Conductivity for Various Piping Materials

Material	K (BTU/hr. F° ft.)	K (W/C° m)
Industrial PVC	0.108	0.187
Industrial Corzan CPVC	0.079	0.137
Carbon Steel	21-31	36-54
Cast Iron	32	55
Copper	222	385
Stainless Steel	9.4-14	16.3-24
FRP	0.13-0.61	0.23-1.06
Polyethelene	0.24-0.29	0.42-0.51
PEX	0.219	0.38

Table 3-11: Coefficients of thermal conductivity for various piping materials

Friction Loss

A major advantage of CPVC pipe is its exceptionally smooth inside surface, which reduces friction loss compared to other materials. Friction loss in CPVC pipe remains constant over extended periods of time in contrast to many traditional materials where the value of the Hazen-Williams C factor (constant for inside roughness) decreases with time. Refer to **Appendices B** and **C** for charts.

C Factors

The relationship between a material's C factor and inside roughness is such that the higher the C factor, the smoother the surface. Tests made both with new pipe and pipe that had been in service revealed C factor values for CPVC pipe between 160 and 165; thus, the factor of 150 recommended for water is on the conservative side. On the other hand, the C factor for metallic pipe varies from 65 to 125 depending upon age and interior roughening. A benefit with CPVC piping is that it is often possible to achieve the desired flow rate using a smaller-diameter pipe, resulting in less initial cost for pipe, valves, fittings, and pumps and still maintaining the same, or even lower, friction losses. A long-term benefit would be the resultant savings in energy required to operate the system.

Hazen-Williams Formula

The head losses resulting from various water flow rates in CPVC piping may be calculated by means of the Hazen-Williams equation below, assuming a value of 150 for C:

Equation 3-9: Pressure Loss

$$h_d = 0.0983 \cdot \frac{5 \text{ gal./min.})^{1.852}}{(0.957 \text{ in.})^{4.8655}}$$

Where:

h_d = Friction head in ft. of water per 100 ft. of pipe

Di = Inside pipe diameter, in.

Q = Flow rate, gal./min.

Equation 3-9 Example

What is the head loss for 50 ft. of 1" Schedule 80 CPVC at a flow rate of 5 gal./minute?

Q = 5 gal./min.

D_i = 1.315 in. – (2 • 0.179) = 0.957 in.

$$h_d = 0.0983 \cdot \frac{5 \text{ gal./min.})^{1.852}}{(0.957 \text{ in.})^{4.8655}}$$

h_d = 2.40 (ft./100 ft.)

h_d = 1.20 (ft./50 ft).

Pressure losses are generally described in PSI for calculations. **Equation 3-9** gives the conversions from head loss to pressure loss for water.

P = h_d • 0.4335

Pressure Loss of Fittings

Pressure loss due to fittings depends on the type. In general, it can be calculated from the following formula:

$$L_e = K_r \bullet \frac{V^2}{2 \bullet g}$$

Where:

L_e = Head loss in equivalent feet of pipe

K_r = Resistance coefficient
(dimensionless, depends on fitting type)

g = Gravitational constant 32 ft./sec.^{2}

V = Flow velocity in ft./sec.

K_r

Sweep 90	Sharp 90	45 Elbow	Tee	Reducer	Increaser
0.4	1.2	0.3	1.3	1.0	0.5

The pressure loss due to all fittings in the piping system is the sum of each L_e. For example, the pressure loss due to ten sweep 90 elbows in a system flowing at 5 ft./sec. is approximately:

$$L_e = (10 \bullet 0.4)\ \frac{5^2}{2 \bullet 32}$$

Chapter 4: Making CPVC Connections

Overview

Uponor ChlorFIT piping products are inspected and handled with great care at the factory using methods developed specifically for manufacturing Schedule 80 Corzan CPVC products to maintain quality during shipping. It is, however, the carrier's responsibility to deliver the shipment in good condition. It is the receiver's responsibility to inspect the products and ensure there has been no loss or damage as well as to properly unload and store the products after receipt. Use reasonable care and caution and follow all available instructions and warnings when handling and storing Uponor ChlorFIT.

The technical data presented in this document is not binding and does not constitute warranted characteristics, guaranteed properties, or guaranteed durability and are subject to modification without notice. Permanent field installations should be done only by properly trained installers. For training information, contact GF Building Flow Solutions at 888.594.7726 or visit uponor.com.

Inspection Prior to Use

Always inspect all products before installation. Do not use products with cuts, gouges, scratches, splits, or other signs of damage. Remove any damaged pipe sections using proper techniques for cutting CPVC pipe. Always cut at least 6" beyond any visible crack.

Note: Ensure the pipe, fittings, and valves being joined are Uponor ChlorFIT Schedule 80 Corzan CPVC from GF Building Flow Solutions. The product characteristics (expansion, contraction, pressures, etc.) among plastics are vastly different. Mixing materials from different manufacturers could result in product failure and/or performance issues. Ensure the solvent cement meets all the requirements of Specification F493 for Schedule 80 CPVC solvent cement. Also, be sure to verify the primer and solvent cement are within their shelf lives.

Piping Tools

For optimum installation results, it is important to use tools specifically designed for use with Uponor ChlorFIT pipe and fittings. Tools for cutting, beveling, and assembling Schedule 80 CPVC pipe and fittings are readily available through local wholesale supply houses.

Important! Do not use tools designed for metal piping systems (e.g., hacksaws, water-pump pliers, pipe wrenches, etc.) as they can cause damage to CPVC pipe and fittings. Visible and non-visible fractures, scoring or gouging of material, and over tightening of plastic threaded connections are common problems associated with the use of incorrect tools and/or procedures.

Pipe Cutters

Uponor ChlorFIT requires square-cut ends to ensure a proper interface between the pipe end and the fitting socket bottom. Use a wheel-type plastic pipe cutter, power saw, miter saw, or fine-toothed saw for cutting Schedule 80 CPVC pipe, and wear proper PPE for safety. Be sure to remove the raised bead on the outside of the pipe after cutting.

Figure 4-1: Wheel-type plastic pipe cutter

Important! DO NOT use ratchet cutters as they may split the pipe during cutting.

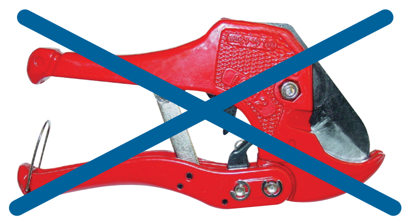


Figure 4-2: Do not use ratchet cutters

Note: Only use tools designed for use with plastics. Ensure they are in good condition in accordance with the tool manufacturer's recommendations. If there is any indication of damage or evidence of cracking on the pipe, cut off at least 6" beyond any visible crack.

Refer to the following GF part numbers for appropriate cutting tools.

- ½" – 2": GF 790.109.001
- 1½" – 4": GF 790.109.002
- 4" – 6": GF 790.109.003
- 6" – 12": GF 90.202.001

Power Saws

Use power saws specifically designed for use with Schedule 80 CPVC pipe. These are particularly useful in prefabrication operations.

Note: Be sure to only use blades designed for Schedule 80 CPVC pipe. Follow the power saw manufacturer's instructions regarding speed, set, and proper use.

Beveling Tools

Portable and mounted power beveling tools as well as hand beveling tools specifically designed for use with Schedule 80 CPVC pipe are also available. Pipe ends must be beveled (chamfered) to allow easy insertion of the pipe into the fitting and to help prevent scraping the solvent cement from the inside of the fitting socket. Use these tools to achieve the recommended bevel of 3⁄32 in. at a 10-degree to 15-degree angle.

Burrs and filings can prevent proper contact between pipe and fitting during insertion or assembly and must be removed from the outside and inside of the cut pipe. A chamfering tool or a file is suitable for this purpose. The end of the pipe should be chamfered to ease insertion of the pipe into the fitting socket. A slight bevel (approximately 10°–15° chamfer) and a minimum width of 3⁄32 in. (2.5 mm) must be placed at the end of the pipe to ease entry of the pipe into the fitting socket. This will minimize the chance that the edges of the pipe will wipe solvent cement or will scrape softened surface material from the fitting socket during the insertion of the pipe.

"A" dimension for various pipe sizes:

- 5⁄64" min. for ½" – 2" pipe
- 3⁄32" min. for 2½" – 3" pipe
- ¼" min. for 4" – 12" pipe
- 1½" min. for 14" – 24" pipe

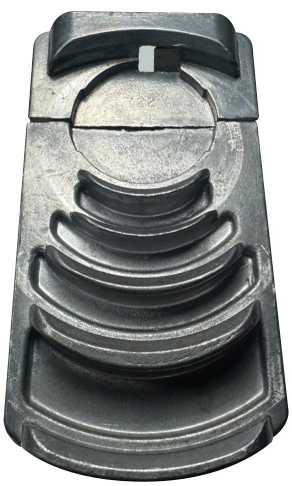


Figure 4-3: Beveling tool

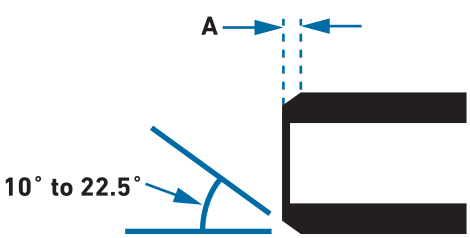


Figure 4-4: Bevel dimensions

Strap Wrenches and Chain Vises

Use strap wrenches with special woven nylon designed for use with CPVC pipe to provide gripping power for turning without scratching or deforming the pipe. Chain vises are made with jaws for holding plastic pipe. The jaws are engineered for use with plastic pipe and provide holding power without damage to the pipe.

Note that chain vises are not recommended, but if it becomes necessary to use these tools to complete the connection(s), it is important to follow these guidelines.

- Cover the jaws with a minimum of 1" (25 mm) rubber.
- Place the chain only on the pipe (never on the fittings).
- Avoid sharp edges of the vise coming into contact with the pipe or fitting wall and causing scratches or scores.

Bench Vises

The use of bench vises is not recommended, but if it becomes necessary to use these tools to complete the connection(s), refer to the following guidelines.

- Cover the jaws with a minimum of 1" (25 mm) rubber.
- Place only the pipe in the jaws of the bench vise (never the fittings).
- Avoid sharp edges of the vise coming into contact with the pipe or fitting wall and causing scratches or scores.
- Do not use a bench vise to seat reducing bushings into socket fittings.

Joining Devices

Pipe and fitting pullers are available that are designed specifically for joining large-diameter Schedule 80 CPVC pipe and fittings 6" and larger. These tools are designed to allow the pipe to be inserted to the proper insertion depth, maintain proper alignment during assembly, and hold freshly solvent-cemented connections to prevent the fitting from backing off the pipe until the initial set time is achieved. Using these tools can also help reduce assembly time.

Other Miscellaneous Tools

Below is a list of other tools that can be helpful throughout the installation process.

- Marking pens and tape measurer
- Deburring tool
- Primer and solvent cement
- Applicators (daubers)
- Chamfering tools
- Hand router with round over bit (recommended for connections 6" and larger)
- Gloves

- Safety glasses
- Lint-free cloth

Solvent Welding

Join Uponor ChlorFIT piping systems in the field via the proven two-step primer and solvent cement welding process.

Safety Precautions

All solvent cements and primers for CPVC piping systems are flammable. Do not use or store near heat, spark, or open flames. Do not smoke during use. Eliminate all ignition sources. Store primer and solvent cement in temperatures between 40°F and 110°F (4°C and 43°C). If storing cement in very cold temperatures and the cement gels, try reconstituting it by bringing it into a warm environment of 60°F to 90°F (16°C and 32°C) and allowing it to sit for 24 hours. Do not apply external heat to raise primer and cement temperatures.

Before use, vigorously shake the solvent cement. Avoid breathing vapors and only use with adequate ventilation. Use explosion-proof general mechanical ventilation or local exhaust to maintain vapor concentrations below recommended exposure limits. In confined or partially enclosed areas, use a ventilating device to remove vapors and minimize inhalation.

Use a NIOSH-approved organic vapor cartridge respirator with a full-face piece or a commercially available respirator specially designed to minimize the inhalation of organic vapors.

Wear splash-proof chemical goggles, PVA-coated protective gloves, and an impervious apron to protect eyes and skin. In case of contact in eyes, flush with water for 15 minutes. If irritation persists, get medical attention. If swallowed, call a physician immediately and follow precautionary statements found on the label of the primer and solvent cement cans. Keep out of reach of children.

Keep containers tightly closed when not in use and covered as much as possible when in use. Recommend the use of an applicator can with applicator attached to a lid. The date on the bottom of the primer and solvent cement can is the date of manufacture. Refer to **Table 4-1** for product shelf life.

Product Shelf Life

Primer	3 years
Solvent cement	2 years

Table 4-1: Product shelf life

Take care when installing in elevator shafts or similar applications where fumes could accumulate or when installing pumps. In all cases, purge lines to remove solvent vapors before welding.

Solvent Cement and Primer Spills

In case of an accidental spill, protect work areas with drop cloths. Solvent cement and/or primer spills can cause irreparable damage, depending on the type of surface. Wipe up accidental spills immediately before the cement sets. Use a mild soap and water mixture to aid in the removal of a stain. Note that using solvents or harsh cleansers may do further damage. In the event of a spill, consult the manufacturer of the affected surface for possible suggestions. Protecting the work area prior to starting is best practice.

Applicators

It is important to use the proper size applicator for the materials being connected. A dauber or swab approximately one-half the size of the pipe is appropriate. The dauber supplied with the primer and solvent cement quart cans is the proper size for pipe sizes 3" and smaller. Use swabs for pipe sizes 4" and larger. **DO NOT** use brushes.

Applicator Selection Chart

Size/Type	Pipe Diameters										
	½"	¾"	1"	1¼"	1½"	2"	2½"	3"	4"	6"	8"
½" dauber	×	×									
¾" dauber		×	×	×	×						
1½" dauber					×	×	×	×			
4" swab									×	×	×

Table 4-2: Applicator selection chart

Primers

Primer is necessary to penetrate and dissolve the surface of the pipe and fitting prior to applying the solvent cement. Apply primer to both the pipe and fittings. Apply primer to the fitting socket, then to the outside of the pipe end, then a second coat to the fitting socket. Dip the applicator into the primer as many times as necessary to ensure the entire surface is wet.

Solvent Cements

Uponor ChlorFIT piping systems use a solvent-based type cement. The solvent dissolves the mating surfaces when properly applied to each surface. The CPVC resin filler in the cement assists in filling the gaps between the pipes and the fitting surfaces. An evaporation retardant slows the rate of evaporation of the primer solvent.

It is essential to join the wet mating surfaces in one minute or less after starting the solvent-weld process to prevent dry spots that will not bond. The bond interface will consist of a mixture of cement resin and dissolved material from the attached pipe and fitting surfaces.

As the solvent evaporates, the interface becomes homogeneous with the pipe and fitting surfaces, except for residual solvent, which dissipates over a period of time. The resulting homogeneous bonded area has led to the term "solvent welded" although no heat is applied to melt and fuse the bonded areas as in metal welding.

Basic Principles of Solvent Welding

Be aware at all times of good safety practices. Always wear protective safety glasses and appropriate personal protective equipment (PPE). Solvent cements for pipe and fittings are flammable, so do not smoke near the product and keep away from other sources of heat or flame in working or storage areas. Be sure to work only in a well-ventilated space and avoid unnecessary skin contact with all solvents.

For consistent joining practices, refer to the following guidelines:

- Ensure the joining surfaces are properly softened and made semi-fluid.
- Apply sufficient cement to fill the gap between the pipe and socket fitting.
- Assemble the pipe and fittings while surfaces are still wet and fluid.
- Connection strength develops as the cement dries. In the tight part of the connection, the surfaces will tend to fuse together; in the loose part, the cement will bond to both surfaces.

Hot-Weather Installation Tips

- Solvent weld in the coolest hours of the day. Pipe and fitting surfaces must be **cooler than 110°F** (**43°C)** prior to making connections.
- Keep primers and solvent cements in cool areas below 110°F (43°C) prior to use.
- Ensure the pipe and fittings are the same temperature prior to making the connection and consider expansion/ contraction factors affecting the pipe in hot weather.
- If possible, store pipe and fittings in shaded areas before solvent welding. Direct sunlight can increase material surface temperatures by 20°F to 30°F (-7°C to -1°C).
- If using damp cloths to cool surfaces, be sure surfaces are dry prior to applying primer and solvent cement.
- Ensure both pipe and fitting surfaces are wet with solvent cement before connecting.
- Solvents permeate hot surfaces faster and deeper; avoid puddling of cement inside the connections and clean up any excess.

Cold-Weather Installation Tips

Solvent weld in the warmest hours of the day. Pipe and fitting surfaces must be **warmer than -15°F** (**-26°C)** prior to making connections.

- Keep primers and cements in warm areas above 40°F (4°C) prior to use.
- Remove any moisture, including ice, frost, or snow, and dry the pipe and fitting surfaces.
- Ensure the pipe and fittings are the same temperature prior to making the connection and consider expansion/ contraction factors affecting the pipe in cold weather (refer to the ChlorFIT Manual for additional information about expansion/contraction).
- If solvent cement becomes too cold and gels, bring into a warm environment of 60°F to 90°F (16°C to 32°C) for 24 hours to reconstitute. **DO NOT** apply direct heat. Shake cement vigorously prior to use.
- If using damp cloths to warm surfaces, be sure surfaces are dry prior to applying primer and solvent cement.
- Solvents permeate cold surfaces slower; make extra effort to work the primer into the pipe and fitting.
- Allow longer cure times before pressure testing.
- If necessary, use a heat blanket on the connection to speed up the set and cure times.

Wet Connections or Repairs

Let joints and connections cure longer if the system is wet (was filled with water). Use riser clamps and threaded rod to hold the secure connection in place when the joint is curing.

Getting Started

1. Prior to beginning the solvent-welding process, be sure to review all safety precautions.
2. Review cement and primer can labels.
3. Review assembly instructions.
4. Condition pipe and fittings being joined to the same temperature conditions prior to use.

Inspection Before Use

Always inspect inside and outside of pipe and fittings for damage before installation. Do not use pipe or fittings with cuts, gouges, scratches, splits, or other signs of damage from improper handling or storage. Cut out any damaged sections on lengths of pipe using proper techniques for cutting CPVC pipe. Always cut at least 6" beyond any visible crack.

Material Check

Ensure the pipe, fittings, and valves are Uponor ChlorFIT from GF Building Flow Solutions. The expansion and contraction features, pressures, etc. among plastics are vastly different. Using materials from different manufacturers could cause failure. Ensure the solvent cement meets all the requirements of Specification F493 for Schedule 80 CPVC solvent cement. Also, verify the primer and solvent cement are within their shelf lives.

Cement Handling

Keep cement containers covered while not in use. If the cement experiences prolonged air exposure, it can become thick and viscous, like a gel. Do not restore the cement by stirring in a thinner. Doing so will render the cement useless, and it will need to be discarded. For this reason, it is beneficial to use smaller containers of cement, especially in warm or hot weather.

Prior to using an unopened can of cement, shake it vigorously to ensure proper dispersion of the resin and solvents. Keep in mind that the solvents contained in cements are highly flammable. **DO NOT** use near an open flame. Ensure the area is well ventilated and avoid prolonged exposure to the fumes. Also, avoid contact with skin or eyes. Handle the cement in the same manner as a very fast-drying lacquer. Always verify the primer and solvent cement are within their shelf lives.

Number of Connections per Quart of Solvent Cement

The amount of solvent cement required for a job can vary due to installation conditions, tolerance variations, and socket depths. Refer to **Table 4-3** for general recommendations. Note that these figures are estimates based on laboratory testing.

Pipe Diameter	½"	¾"	1"	1¼"	1½"	2"	3"	4"	6"	8"
Number of Connections	325	250	150	125	90	70	50	30	10	8

Table 4-3: Connections per quart of solvent cement

Assembly Instructions

1. Begin by cutting the pipe ends square using the appropriate pipe cutter for Uponor ChlorFIT Schedule 80 CPVC (wheel-type plastic pipe cutter, power saw, chop saw, or fine-toothed saw).
   Note: DO NOT use ratchet cutters as they may split the pipe during cutting.
2. Deburr the inside and chamfer the outside of the pipe ends.
3. Clean the pipe and fitting with an approved cleaner designed specifically for Schedule 80 CPVC.
4. Measure the socket depth on the fitting. Mark the socket depth on the pipe and place a second mark 2" from the first mark.
5. Dry fit the pipe and fitting prior to applying the primer and cement. The pipe should go about one-third to two-thirds of the way into the fitting. If the pipe goes all the way to the end of the fitting, you'll need to remember to add more solvent cement when completing the connection.
6. Use a suitable applicator at least half the size of the pipe diameter to apply the primer and solvent cement.
7. Apply primer using the appropriate applicator shown in **Table 4-2**. Apply in the following order: first inside the fitting, next on the pipe exterior, and then again to the inside of the fitting.
   Note: When applying the primer, continue the application until you feel tension on the applicator brush. This signals the appropriate softening of the material in preparation for the solvent cement application.
8. After applying the appropriate amount of primer, **immediately** apply the cement. Apply a liberal coat to the pipe exterior and beyond the fitting depth as well as the fitting interior. Then, apply another coat to the pipe exterior
   Note: GF Building Flow Solutions recommends the use of **medium to heavy body cements**, which are proven more reliable, especially with thicker-walled pipe.
   Important! Apply an even layer of solvent cement while the primer is still wet and the surfaces are soft. **DO NOT** apply solvent cement to surfaces after the primer has dried.
9. Ensure a thin coat of cement inside the fitting to prevent puddling, which can cause a weakening of the connection and potential failure.
10. Assemble the parts **QUICKLY**. Ensure the cement is fluid. Dried cement cannot be recoated.
11. During assembly, rotate the pipe or fitting (when possible) one-quarter turn. Do not rotate the pipe or fitting after the connection has bottomed out.
12. Ensure pipe end bottoms out inside the fitting and hold for 30 seconds to ensure the pipe does not push back out.
13. Wipe off excess cement.
14. Refer to the following charts for recommended setup and cure times before pressure testing.

Setup Times

The following chart shows general guidelines on setup time required prior to handling a connection. Note that these times vary depending on the solvent cement manufacturer, so it is important to reference the manufacturer's guidelines for exact times.

Note: In damp conditions or weather above 60% relative humidity, allow **50%** additional time.

Pipe Diameter	Temperature During Assembly			
	60°F to 100°F (16°C to 38°C)	40°F to 59°F (4.4°C to 15°C)	20°F to 39°F (-6.7°C to 3.9°C)	0°F to 19°F (-18°C to -7.2°C)
½" to 1¼"	2 minutes	5 minutes	8 minutes	10 minutes
1½" to 3"	5 minutes	10 minutes	12 minutes	15 minutes
4" to 5"	15 minutes	30 minutes	1 hour	2 hours
6" to 8"	30 minutes	1½ hours	3 hours	6 hours

Table 4-4: Setup times

Cure Times

The following chart shows general guidelines on cure times after completing a connection and before pressure testing the system. Note that these times vary depending on the solvent cement manufacturer, so it is important to reference the manufacturer's guidelines for exact times.

Note: This data is for new installations only. For repair or cut-ins on hot-water and cold-water distribution systems, contact GF Building Flow Solutions Technical Services.

Note: In damp conditions or weather above 60% relative humidity, allow **50%** additional time.

Pipe Diameter		Temperature During Assembly and Cure Period			
		60°F to 100°F (16°C to 38°C)	40°F to 59°F (4.4°C to 15°C)	20°F to 39°F (-6.7°C to 3.9°C)	0°F to 19°F (-18°C to -7.2°C)
½" to 1¼"	Up to 180 PSI	1 hour	2 hours	Contact GF Building Flow Solutions	
	180 PSI +	6 hours	12 hours		
1½" to 3"	Up to 180 PSI	2 hours	4 hours		
	180 PSI +	12 hours	24 hours		
4" to 5"	Up to 180 PSI	6 hours	12 hours		
	180 PSI +	18 hours	36 hours		
6" to 8"	Up to 180 PSI	8 hours	16 hours		
	180 PSI +	24 hours	48 hours		

Table 4-5: Cure times

Connection Best Practices

- Ensure a proper square but, bevel, and deburr of the pipe.
- Use medium to heavy body cements in place of lighter cements.
- Use the proper size applicator for sufficient cement application.
- Avoid puddling of cement or primer. This causes excess softening of the material and could cause product damage, especially in small-diameter pipe.
- Ensure the cement is still wet when making connections. In certain cases where the cement-to-joining times may extend beyond one minute, perform a test by preparing a scrap piece of pipe with the primer, applying a full, even-coating stroke with the solvent cement applicator, and checking to see if the cement is still wet after one full minute.
- Ensure cement has not gelled.
- Ensure proper amount of cement applied to all appropriate surfaces.
- Avoid excess gaps which cannot be satisfactorily filled.
- Make the connection quickly. Excess time to make the connection after the start of the application can result in difficulty bottoming the fitting since the lubrication effect of the cement has dissipated.
- Avoid making connections when surrounding temperatures or material surfaces are above 110°F (43°C). This will cause too much of the primer solvent to evaporate.
- Avoid making connections in excess humidity conditions.
- Avoid adjusting the connection and breaking the bond prior to a firm set.
- I**mportant:** If during the joining process or pressure testing a leaking or improper fitting is found, **DO NOT** repair by reapplying additional primer and solvent. Dimensions have changed, and these connections need to be cut out and restarted on new fittings and pipe where primer and solvent have not been applied.

Note: Scan QR code to access a video that shows the step-by-step instructions for properly solvent welding Uponor ChlorFIT Schedule 80 Corzan CPVC.

Tolerances and Fits

Uponor ChlorFIT pipe and fittings are manufactured in accordance with applicable ASTM standards to produce an interference fit when assembled. Test the dry fit of the parts for proper interference fit. The pipe should insert easily into the fitting socket but become tight about one-third to two-thirds of the socket depth.

In the case of a loose fit due to a fitting with a maximum diameter and a pipe with a minimum diameter, apply two coats of solvent cement or use a heavier-bodied cement. Conversely, if the pipe diameter is on the maximum side and the fitting on the minimum side, the interference may be too great. Sand the pipe outer diameter to allow a proper insert depth.

For these specific reasons, it is important to check dry fits prior to making a solvent-welded connection. In the case of Schedule 80 fittings, the heavy wall on the pipe will cause the pipe to be out of round. Interference can be less on large-diameter Schedule 80 CPVC fittings (particularly fabricated fittings) which, in many cases, will allow the pipe to be dry fit to the pipe stop with very little interference.

In these conditions, it may be necessary to use an extra-heavy-bodied solvent cement and apply more than one coat to the pipe and fitting. It is also important to inspect all piping system components for damage or irregularities prior to assembly to ensure tolerances and engagements are compatible. Do not use any components that appear irregular or do not fit properly.

Belled-End Pipe

In some installations, using belled-end pipe can eliminate the need for couplings. When using belled-end pipe, ensure the interior surface of the bell penetrates exceptionally well with the primer. Refer to **Figure 4-5** and **Table 4-6** for belled-end pipe dimensions.

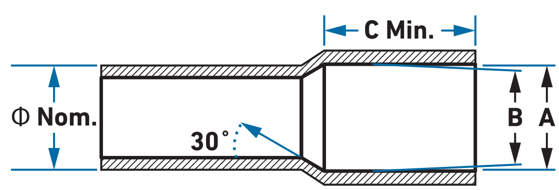


Figure 4-5: Belled-end pipe dimensions

Nominal O.D.	A		B		C
	Min. (in.)	Max. (in.)	Min. (in.)	Max. (in.)	Min. (in.)
1¼"	1.675	1.680	1.648	1.658	1.870
1½"	1.905	1.914	1.880	1.888	2.000
2"	2.381	2.393	2.363	2.375	2.250
2½"	2.882	2.896	2.861	2.875	2.500
3"	3.508	3.524	3.484	3.500	3.250
4"	4.509	4.527	4.482	4.500	4.000
5"	5.573	5.593	5.543	5.563	4.000
6"	6.636	6.658	6.603	6.625	6.000
8"	8.640	8.670	8.595	8.625	6.000
10"	10.761	10.791	10.722	10.752	8.000
12"	12.763	12.793	12.721	10.751	8.500
14"	14.030	14.045	13.985	14.000	9.000
16"	16.037	16.052	15.985	16.000	10.000
18"	18.041	18.056	17.985	18.000	12.000
20"	20.045	20.060	19.985	20.00	12.000
24"	24.060	24.075	24.000	24.015	14.000

Nominal O.D.	A		B		C
	Min. (in.)	Max. (in.)	Min. (in.)	Max. (in.)	Min. (in.)
1¼"	42.5	42.7	41.9	42.1	47.5
1½"	48.4	48.6	47.8	48.0	50.8
2"	60.5	60.8	60.0	60.3	57.2
2½"	73.2	73.6	72.7	73.0	63.5
3"	89.1	89.5	88.5	88.9	82.6
4"	114.5	115.0	113.8	114.3	101.6
5"	141.6	142.1	140.8	141.3	101.6
6"	168.6	169.1	167.7	168.3	152.4
8"	219.5	220.2	218.3	219.1	152.4
10"	273.3	274.1	272.3	273.1	203.2
12"	324.2	324.9	323.1	323.9	215.9
14"	356.4	356.7	355.2	355.6	228.6
16"	407.3	407.7	406.0	406.4	254.0
18"	458.2	458.6	456.8	457.2	304.8
20"	509.1	509.5	507.6	508.0	304.8
24"	611.1	611.5	609.6	610.0	355.6

Table 4-6: Belled-end pipe dimensions

Note: GF Building Flow Solutions does not use silicone lubricants in the belling process. However, some manufacturers use a silicone release agent on the belling plug, and a residue of this agent can remain inside the bell. It is important to remove this residue in the cleaning process prior to solvent welding.

Large-Diameter Pipe

When making solvent-weld connections for pipe sizes 4" and larger, it may be necessary to use two people to apply the solvent cement simultaneously to the pipe and fitting. Additional installers can help push the pipe into the fitting socket while the cemented surfaces are still wet and ready for insertion.

Alignment of large-diameter pipe and fittings is much more critical than when working with small-diameter pipe. Specialty large-diameter joining tools, developed specifically for joining large-diameter CPVC piping products, are available.

It is important to use the appropriate-size applicator for applying the primer and cement on large-diameter pipe. Use a roller approximately one-half the size of the pipe diameter. As the pipe diameter increases, the range of tolerances also increases, which can result in out-of-round and gap conditions. Speed in making the connection and applications of heavy coats of solvent cement in these cases is important.

When working with 8" to 24" pipe diameters, checking the dry fit of the pipe and fittings is more critical. In some cases, interference fits may not be present where fabricated fittings are used. Consequently, it will be necessary to apply more than one coat of cement to the pipe and fitting. It is essential to use a heavy-bodied and/or extra-heavy-bodied, slow-drying cement on these large-diameter sizes.

NPT Connections

Threaded CPVC systems are not recommended in high-pressure applications, piping layouts where leaks would be dangerous, or for pipe sizes larger than 4". However, they do offer benefits in two scenarios — quick dismantling for temporary or take-down applications and joining to non-plastic materials.

Note: Threading CPVC causes a 50% reduction in system pressure rating. Refer to **Table 3-7** for derated pressure ratings based on temperature for plastic threaded fittings.

Theoretically, it is possible to use any combination of threaded parts, such as:

- Schedule 80 CPVC male to metal female
- Schedule 80 CPVC male to Schedule 80 CPVC female
- Metal male to Schedule 80 CPVC female (**DO NOT USE**)

A male plastic thread can be inserted into a female metal thread if heat is not involved and both lines are anchored immediately adjacent to the connection. However, male metal threads should **NOT** be connected to a female Schedule 80 CPVC pipe thread, as noted in the third bullet above. The reason for this is due to the incompressibility of metal in relation to Schedule 80 CPVC. Refer to **Figure 4-6** below and **Table 4-7** on the following page for details.

Pipe Threads Dimensions

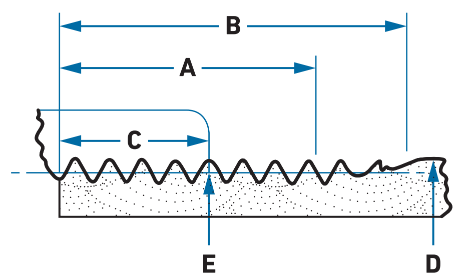


Figure 4-6: Pipe threads dimensions

American Standard Taper Pipe Thread Dimensions in Imperial Units

Pipe			Thread				
	D		C	A	B	E	
Nominal Size	Outside Diameter (in.)	Thread Per Inch	Normal Engagement by Hand (in.)	Length of Effective Thread (in.)	Total Length End of Pipe to Varnish Point (in.)	Pitch Diameter at End of Internal Thread (in.)	Depth of Thread (Max.) (in.)
½"	0.840	14	0.320	0.5337	0.7815	0.77843	0.05714
¾"	1.050	14	0.339	0.5457	0.7935	0.98887	0.05714
1"	1.315	11.5	0.400	0.6828	0.9845	1.23863	0.06957
1¼"	1.660	11.5	0.420	0.7068	1.0085	1.58338	0.06957
1½"	1.900	11.5	0.420	0.7235	1.0252	1.82234	0.06957
2"	2.375	11.5	0.436	0.7565	1.0582	2.29627	0.06957
2½"	2.875	8	0.682	1.1375	1.5712	2.76216	0.10000
3"	3.500	8	0.766	1.2000	1.6337	3.38850	0.10000
4"	4.500	8	0.844	1.3000	1.7337	4.38713	0.10000
6"	6.625	8	0.958	1.5125	1.9472	6.50597	0.10000
8"	8.625	8	1.063	1.7125	2.1462	8.50003	0.10000
10"	10.750	8	1.210	1.9250	2.3587	10.62094	0.10000
12"	12.750	8	1.360	2.1250	2.5587	12.61781	0.10000

Table 4-7: American standard taper pipe thread dimensions in Imperial units

American Standard Taper Pipe Thread Dimensions in Metric Units

Pipe		Thread					
	D		C	A	B	E	
Nominal Size	Outside Diameter (mm)	Thread Per mm	Normal Engagement by Hand (mm)	Length of Effective Thread (mm)	Total Length End of Pipe to Varnish Point (mm)	Pitch Diameter at End of Internal Thread (mm)	Depth of Thread (Max.) (mm)
½"	21.3	355.6	8.13	13.56	19.85	19.772	1.451
¾"	28.7	355.6	8.61	13.86	20.15	25.117	1.451
1"	33.4	292.1	10.16	17.34	25.01	31.461	1.767
1¼"	42.2	292.1	10.67	17.95	25.62	40.218	1.767
1½"	48.3	292.1	10.67	18.38	28.04	48.287	1.767
2"	60.3	292.1	11.07	19.22	28.88	58.325	1.767
2½"	73.0	203.2	17.32	28.89	39.91	70.159	2.540
3"	88.9	203.2	19.46	30.48	41.50	88.068	2.540
4"	114.3	203.2	21.44	33.02	44.04	111.433	2.540
6"	168.3	203.2	24.33	38.42	49.46	165.252	2.540
8"	219.1	203.2	27.00	43.50	54.51	215.901	2.540
10"	273.1	203.2	30.73	48.90	59.91	269.772	2.540
12"	323.9	203.2	34.54	53.98	64.99	320.492	2.540

Table 4-8: American standard taper pipe thread dimensions in Metric units

Thread Sealant

Use either a thread sealant (pipe dope) approved for use with Uponor ChlorFIT Schedule 80 Corzan CPVC or PTFE tape (but not both) to seal threads. Use a thin, even coat of sealant. Install PTFE tape in a clockwise direction starting at the bottom of the thread and overlapping each pass. Do not employ more than three wraps.

Making the Connection

Start the threaded connection carefully by hand to avoid cross threading or damaging threads. Turn until hand tight. Mark the location with a marker. With a strap wrench on the plastic part, turn an additional half turn.

If leakage occurs during pressure testing, refer to **Table 4-9** for next steps.

Steps to Compensate for Leakage During Pressure Testing

Connection Type	Next Step
Thermoplastic to Thermoplastic	Tighten up to ½turn
Thermoplastic Male to Metal Female	Tighten up to ½turn
Thermoplastic Male to Thermoplastic Female	Consult Factory

Table 4-9: Steps to compensate for leakage during pressure testing

Note: Threaded connections are susceptible to fracture or leaking due to misalignment. Be sure to install pipe without bending. Refer to the support spacing information in this manual for thermal expansion allowances.

Flange Connections

Read all instructions before attempting to install flanges. Like all Schedule 80 CPVC pipe and fittings, flanges are lightweight, inexpensive, and easy to install. However, Schedule 80 CPVC materials have different physical properties than metals. Therefore, it is important to take special care to promote a long, reliable service life.

Flanges are generally used when:

- The piping system may need to be dismantled
- The installation is temporary or mobile
- Transitioning between dissimilar materials that cannot be cemented together
- The installation environment is not conducive to solvent welding
- **Important:** Always install flanges on equipment (e.g., tanks, pumps, etc.) first and tighten bolts. Installing in this sequence will reduce the amount of stress and torque on a fitting while it is curing.

Refer to the following instructions for proper installation of flanges.

Gaskets

Visually inspect flanges for cracks, deformities, solvent cement, and other obstructions on the sealing surfaces prior to installation.

Gasket Dimensions

Size	Minimum O.D.		Maximum I.D.	
	Inch	mm	Inch	mm
½"	3.5	88.9	0.88	22.4
¾"	3.88	98.6	1.10	27.9
1"	4.25	108.0	1.38	35.1
1¼"	4.63	118.0	1.60	40.6
1½"	5.00	127.0	1.93	49.0
2"	6.00	152.0	2.44	62.0
2½"	7.00	178.0	2.91	73.9
3"	7.50	191.0	3.59	91.2
4"	9.00	229.0	4.64	118.0
6"	11.00	279.0	6.82	173.0
8"	13.50	343.0	8.66	220.0
10"	16.00	406.0	10.81	275.0
12"	19.00	483.0	12.09	307.0

Table 4-10: Gasket dimensions

Gasket Dimension Labels

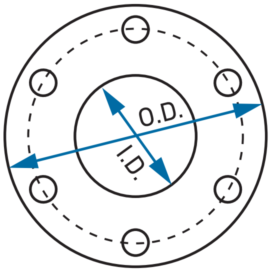


Figure 4-7: Gasket dimension labels

Use a rubber gasket between the flange faces to ensure a good seal. For Uponor ChlorFIT Schedule 80 Corzan CPVC piping systems, GF Building Flow Solutions recommends a ¼"-thick, full-face gasket with a Shore A scale hardness of 70±5, and the bolt torque values shown in **Table 4-12**. For other hardness requirements, contact GF Building Flow Solutions Technical Services.

Select the gasket material based on the chemical resistance requirements of the system. A full-face gasket should cover the entire flange-to-flange interface without extending into the flow path. **Table 4-10** gives required gasket dimensions for Uponor ChlorFIT Van Stone Flanges.

Bolt Hardware

It is critical to avoid excessive compression stress on the Van Stone Flange. Only use low-friction fastener materials that allow torque to be applied easily and gradually. This will ensure flanges are not subjected to sudden, uneven stress during installation, which can lead to cracking.

Ensure the bolt or the nut (preferably both) are zinc-plated for minimal friction. If using stainless-steel bolts and nuts, use lubricant to prevent high friction and seizing.

The following fastener combinations are acceptable:

- Zinc-on-zinc, with or without lubricant
- Zinc-on-stainless steel, with or without lubricant
- Stainless steel-on-stainless steel, with lubricant only

Cadmium-plated fasteners, while becoming more difficult to obtain due to environmental concerns, are also acceptable with or without lubricant. Galvanized and carbon-steel fasteners are not recommended. Use a copper-graphite anti-seize lubricant to ensure smooth engagement and the ability to disassemble and reassemble the system easily. Refer to the fastener specifications in **Table 4-11** for further details.

Fastener Specifications

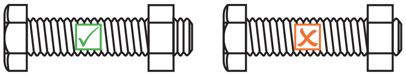
Flange Size	Number of Bolts	Length	Bolt Size-Type	Washer Size-Type
½"	4	2½"	½"-UNC	½"-SAE[3]
¾"	4	2½"	½"-UNC	½"-SAE
1"	4	2¾"	½"-UNC	½"-SAE
1¼"	4	2¾"	½"-UNC	½"-SAE
1½"	4	3¼"	½"-UNC	½"-SAE
2"	4	3½"	⅝"-UNC	⅝"-SAE
2½"	4	4"	⅝"-UNC	⅝"-SAE
3"	4	4"	⅝"-UNC	⅝"-SAE
4"	8	4¼"	⅝"-UNC	⅝"-SAE
6"	8	4½"	¾"-UNC	¾"-SAE
8"	8	5"	¾"-UNC	¾"-SAE
10"	12	5"	⅞"-UNC	⅞"-SAE
12"	12	5"	⅞"-UNC	⅞"-SAE
14"	12	5½"	1"-UNC	1"-SAE
16"	16	5½"	1"-UNC	1"-SAE
18"	16	5½"	1⅛"-UNC	1⅛"-SAE
20"	20	6"	1⅛"-UNC	1⅛"-SAE
24"	20	6½"	1¼"-UNC	1¼"-SAE

Table 4-11: Fastener specifications

1. Suggested bolt length for flange-to-flange connection with ¼"-thick gasket. Adjust bolt length as required for other types of gasket thicknesses.
2. Minimum spec. Use of a stronger or thicker washer is always acceptable as long as published torque limits are observed (also known as Type A Plain Washers, Narrow Series).
3. ASTM F436 required for larger sizes to prevent warping at high torque.

Ensure bolts are long enough that two complete threads are exposed when the nut is tightened by hand. While using a longer bolt does not compromise the integrity of the flange connection, it wastes material and may make tightening more difficult due to interference with nearby system components.

Exposed Threads Example



Bolt Hole Configurations

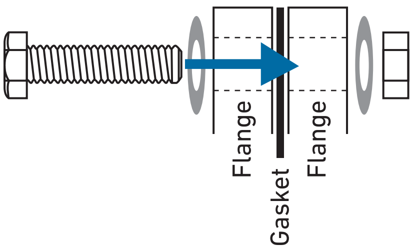


Figure 4-8: Exposed threads and bolt hole configurations examples

Use a washer under each bolt head and nut. The purpose of the washer is to distribute pressure over a wider area, reducing the compression stress under the bolt head and nut.

Note: Failure to use washers voids the GF Building Flow Solutions warranty.

Torque Wrench

Controlling bolt torque is important to avoid damaging the flange, and continuing to tighten the bolts beyond the recommended torque levels may actually damage the seal. Because bolt torque is critical to the proper function of a flange, it is necessary to use a current, calibrated torque wrench accurate to within ±1 ft.-lb. when installing flanges. Experienced installers may be tempted to forego the use of a torque wrench, relying instead on feel. GF Building Flow Solutions does not endorse this practice. Jobsite studies have shown that experienced installers are only slightly better than new trainees at estimating bolt torque by feel. A torque wrench is always recommended.

Note: Never use an impact wrench to install a flange.

Checking System Alignment

Before assembling the flange, ensure the two parts are properly aligned. Refer to the following "pinch test" instructions that allow the installer to assess system alignment quickly and easily with minimal tools.

1. Check the gap between flange faces by pinching the two mating components toward each other with one hand as shown in **Figure 4-9**. If the faces can be made to touch, then the gap between them is acceptable.
2. Check the angle between the flange faces. If the faces are completely flush when pinched together, as shown in **Figure 4-9**, the alignment is perfect.
3. If only one side is touching during the pinch test, measure the gap between the faces on the opposite side. The gap should be no more than ⅛".

Pinch Test Examples

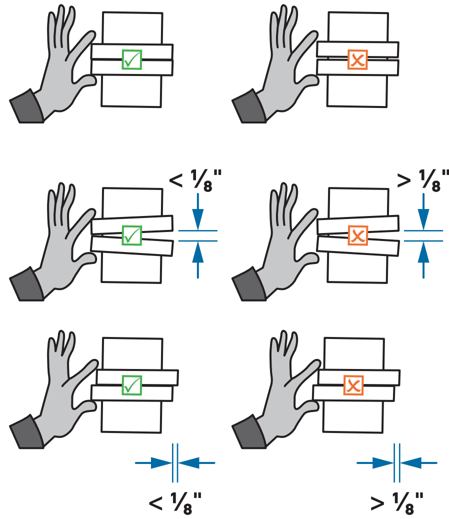


Figure 4-9: Check system alignment via pinch test

To assess high/low misalignment, pull the flange faces flush together. If the faces are concentric within ⅛", the high/low misalignment is acceptable.

If the gap between the mating components cannot be closed by pinching them with one hand, or if the angle or high/low misalignment between them is too large, then using the bolts to force the components together will result in excessive stress and possible failure during or after installation. In this case, inspect the system to find the greatest source of misalignment and refit the system with proper alignment before bolting.

Note: The bolt holes of a Van Stone Flange will align automatically when the bolts are inserted and tightened. No additional adjustment is necessary. To align the bolt holes of a fixed flange, use standard two-holing procedure.

Note: While the pinch test is a good rule of thumb, always use common sense. If it seems difficult or awkward to pull the flange faces together, stop the installation and either refit the system or consult your GF Building Flow Solutions representative before proceeding.

Placing the Gasket

Center the gasket between the flange faces with the bolt holes aligned with corresponding holes in the gasket. A full-face gasket cut to the specified dimensions should come just to the inner edge of the flange face near the flow path or overlap the edge slightly. See **Table 4-10** for the specified dimensions.

Inserting the Bolts

If using copper-graphite anti-seize lubricant as recommended, apply the lubricant evenly with a brush directly to the bolt threads and to the nut, if desired. Cover the bolt from its tip to the maximum extent to which the nut will be threaded. Insert bolts through washers and bolt holes as shown in **Figure 4-10.** Tighten all nuts by hand. As you tighten each nut, the nuts on the other bolts will loosen slightly. Continue to hand-tighten all of the nuts until none remain loose. Now, the flange assembly will remain in place as you prepare to fully tighten it. Again, when hand-tightened, at least two threads beyond the nut should be exposed in order to ensure permanent engagement. If less than two threads are exposed, disassemble the flange and use longer bolts. See **Figure 4-8** for reference.

Tightening the Bolts

Flanges require gradual, even bolt tightening. Tightening one bolt to the maximum recommended torque while other bolts are only hand-tight or tightening bolts in the wrong order produces uneven stresses that may result in cracking or poor sealing. To ensure even distribution of stresses in the fully installed flange, tighten the bolts in a star pattern as described in ANSI B16.5 and shown in **Figure 4-10**.

Bolt Tightening Order

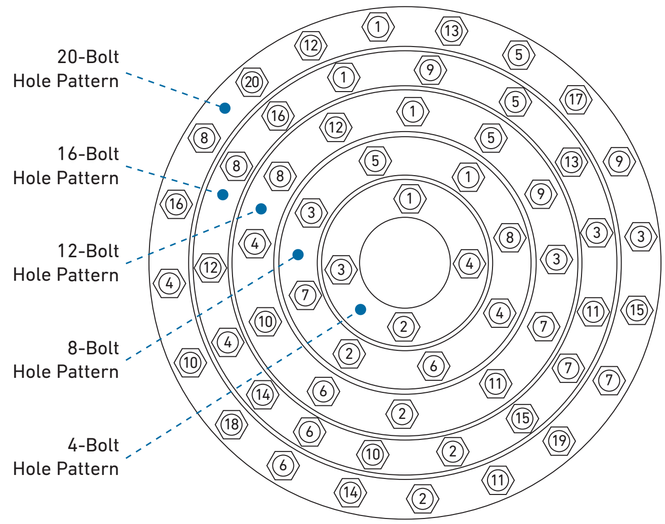


Figure 4-10: Bolt tightening order

For the installer's convenience, the pattern is also indicated by numbers molded into the flange next to each bolt hole. The torque required on each bolt in order to achieve the best seal with minimal mechanical stress has been carefully studied in laboratory and field installations. Refer to **Table 4-12** for details.

Multiple Pass Bolt Torques

Size	Torque Sequence, ft. - lb. (N – m) Lubricated Threads*				Torque Sequence, ft. - lb. Non-Lubricated Threads			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th
½"	3	5	–	–	5	8	–	–
¾"	3	5	–	–	5	8	–	–
1"	3	5	–	–	5	8	–	–
1¼"	3	5	–	–	5	8	–	–
1½"	3	5	–	–	5	8	–	–
2"	5	8	–	–	5	10	12	–
2½"	5	8	10	–	10	15	18	–
3"	5	12	15	–	15	20	25	–
4"	10	15	20	–	15	25	32	–
6"	12	24	30	–	20	32	42	–
8"	15	35	40	–	20	40	50	60
10"	25	50	60	–	20	40	60	70
12"	30	60	72	–	20	50	65	80
14"	22	44	88	110	28	55	110	138
16"	22	44	88	110	28	55	110	138
18"	22	44	88	110	28	55	110	138
20"	22	44	88	110	28	55	110	138
24"	22	44	88	110	28	55	110	138

Table 4-12: Multiple pass bolt torques

*GF Building Flow Solutions recommends using copper-graphite anti-seize lubricant.

To ensure even distribution of stresses and a uniform seal, tighten the bolts to the first torque value in the sequence using a star pattern. Then, repeat the star pattern while tightening to the next torque value. Continue this pattern to the maximum torque value.

Because Schedule 80 CPVC deforms slightly under stress, a final tightening after 24 hours is recommended, when practical, to tighten any loose bolts due to relaxation of the material. If a flange leaks when pressure tested, retighten the bolts to the full recommended torque and retest. Do not exceed the recommended torque before consulting an engineer or a GF Building Flow Solutions representative.

Note: Torques listed in **Table 4-12** are for flange-to-flange connections in which the full faces of the flanges are in contact. For other types of connections, such as between a flange and a butterfly valve, where the full face of the flange is not in contact with the mating component, less torque will be required. Do not apply the maximum-listed torque to the bolts in these connections since the flange is not fully supported by the mating component. Doing so may cause deformation or damage. Instead, start with approximately two-thirds of the listed maximum torque and increase as necessary.

Documentation

Keep instructions available and provide a copy of these instructions to every installer on the jobsite prior to beginning installation. Installers who have worked primarily with metal flanges often make critical mistakes when installing plastic flanges. Even experienced installers will benefit from a quick review of good installation practices before starting a new job.

Best practices include tagging each flange with installation tags, including:

- Installer's initials
- Installation date
- Final torque value
- Confirmation of 24-hour torque check

Record information on preprinted stickers (see **Figure 4-11**). and place on each flange immediately after installation.

Installation Tag Example

Installed By

Date

Final Torque (Ft./lb.)

24-Hour Check

Figure 4-11: Installation tag example

Specialty Adapters

Specialty reinforced molded female adapters are available for use as transition fittings to change materials. Unlike conventional plastic female adapters, these fittings incorporate the use of a stainless-steel restraining collar located on the exterior of the FPT threads of the adapter. This design allows direct connection to male metal threads without the need for pressure derating normally associated with conventional FPT adapters, as the radial stress generated by thread engagement is contained. In addition, this style of fitting also helps to compensate for stresses that may be generated as the result of differences in dissimilar material, thermal expansion/contraction rates, and related stresses.

ProPEX® F1960 Expansion Adapters

GF Building Flow Solutions offers ProPEX® lead-free (LF) brass spigot and socket adapters for connecting Uponor PEX-a piping to Uponor ChlorFIT Schedule 80 Corzan CPVC piping systems. Available in sizes from ½" to 3", the adapters offer a 50% decrease in the number of installation steps by eliminating the need for additional adapters, providing increased jobsite efficiencies and material cost savings for installing contractors along with improved system performance for building owners and occupants. They also allow engineers to maximize designs to the full pressure rating available for a system (because threaded connections require a 50% reduction in the pressure rating).

Union Connections

Read all instructions before attempting to install unions or valves. Because unions and ball valves have similar threaded nut connectors, these instructions are written with both components in mind. GF Building Flow Solutions unions and true union ball valves are designed to provide many years of service when installed properly. As with any piping system components, it is important to keep in mind considerations during installation to help ensure optimal performance. Even experienced installers will benefit from reviewing these instructions before each installation.

Valve Support

Ensure ball valves are well supported. An unsupported or insufficiently supported valve body will twist when opened and closed, subjecting the union connection to torque stress that may cause cracking or distortion and subsequent leakage.

System Alignment

The major contributor to union nut failures is misalignment. Uneven compression of the O-ring will cause leaks. The stress of holding a misaligned system together can damage union nuts. GF Building Flow Solutions union connections use an O-ring as the sealing mechanism, which is highly effective under relatively low tightening force. An often-overlooked issue is the presence of dirt and debris on the O-ring or sealing surface. This will prevent proper O-ring sealing. If this is present on the nut body threads, it will clog the threads and prevent proper tightening.

Note: Never use any foreign substance or object to hold the O-ring in place. Never use the union nuts to draw together any gaps between the mating faces of the components or to correct any system misalignment.

Installation

Understand and carefully follow these guidelines for proper installation to guard against leaks while avoiding excessive forces that can damage the union nut.

1. Always remove the union nut and end connectors from the ball valve for installation.
2. Slide the union nut onto the pipe with the thread facing the proper direction before installing the end connector.
3. Solvent cement the pipe into the union or ball valve sockets before the union nut connections are engaged.
4. Be careful not to get any cement on the sealing surfaces, which can disrupt the seal and cause leaks.
5. For best results, allow the cemented connection to properly cure prior to assembling the union nut to avoid damaging the uncured connection.
6. Once the cement has cured, ensure the O-ring is securely seated in its groove. The O-ring should rest securely in place without adhesive or other aids.
7. There should be no gap between the mating components. The threaded nut serves only to compress the O-ring, thus creating the seal. However, a small gap (less than ⅛") between the mating components is acceptable.

Hand Tightening for All Sizes

The next step is to hand-tighten the union nut.

1. With the O-ring in place, engage the nut with its mating threads and turn clockwise with one hand.
2. Continue turning with moderate force until the nut no longer turns.
3. Be careful to use reasonable force when tightening the nut. The nut should turn easily until it bottoms out and brings the mating faces into direct contact. It is recommended to place an indexing mark with a permanent marker on the union nut and bolt to identify the hand-tight position.
4. Union and true union ball valve sizes should be sufficiently sealed after hand-tightening for the hydrostatic pressure test of the system.

Note: Do not use any form of lubricant on the threads of the union nut.

Indexing Mark Example

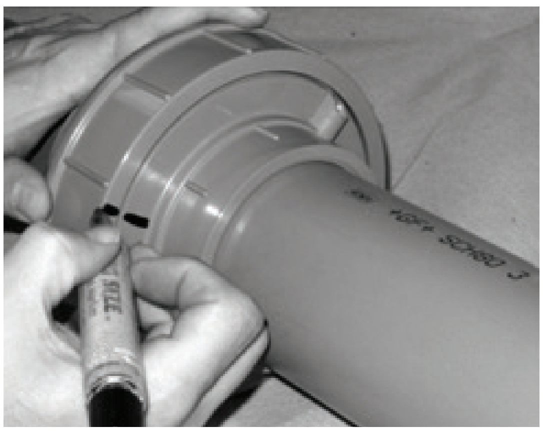


Figure 4-12: Indexing mark example

Tightening for 2" to 4" Sizes

Based on experience or system requirements, the installer may choose to turn the nut an additional ⅛ turn to ensure a better seal before hydrostatically pressure testing the system. To do this, use a strap wrench to turn the nut ⅛ turn past the index mark applied after assembly.

Note: Do not use any metallic tools. Tool marks on the union nut will void the manufacturer's warranty.

At this point, the system should be hydrostatically pressure tested before turning the union nut any further.

Post-Test Tightening (½" to 1½" sizes only)

When tightened as instructed above, it is highly unlikely a union nut connection will leak under normal operating conditions. In the unlikely event a leak occurs, tighten the union nut an additional ⅛ turn as described in **Table 4-13**. Then, retest the system.

Size	Initial	Additional, Pre-Test	Additional, Post-Test
½"	Hand-Tight	None	⅛ Turn Max.
¾"	Hand-Tight	None	⅛ Turn Max.
1"	Hand-Tight	None	⅛ Turn Max.
1¼"	Hand-Tight	None	⅛ Turn Max.
1½"	Hand-Tight	None	⅛ Turn Max.
2"	Hand-Tight	⅛ Turn Max.	Consult Factory
3"	Hand-Tight	⅛ Turn Max.	Consult Factory
4"	Hand-Tight	⅛ Turn Max.	Consult Factory

Table 4-13: Tightening guide for union and ball valve nuts

Note: If the connection still leaks after post-test tightening, do not continue to tighten the nut. Recheck the system alignment and check for obstructions in the sealing area. If the cause of a leak cannot be determined or if you suspect the union (or valve) is defective, contact your GF Building Flow Solutions representative for further instructions.

Quality Check After Assembly

To check if the union connections are installed in a stress-free manner, perform a random check of the alignment by removing the nut on the selected union connections one at a time. A properly installed system will not have any movement of the piping as the nut is loosened. If any springing action occurs, take steps to remove the stress prior to reinstalling the union nut.

Groove Connections

Use grooved-style couplings for transitioning Schedule 80 CPVC to metallic piping. In addition to the ease of disassembly, this type of connection also allows for a certain degree of angular adjustment and expansion/contraction.

To prepare the Schedule 80 CPVC pipe for adapting the grooved-style couplings, start by cutting a groove onto the end of the pipe. Where shock loads from intermittent operation are probable (particularly with large-diameter pipe), avoid angular displacement. Align the pipe longitudinally to minimize high stress levels on the grooves.

Grooved collars are available, which can be solvent welded to the pipe using a coupling. This can save time and expense if grooving tools and equipment are not available.

The pressure rating of grooved-end piping varies with schedule, pipe size, temperature, and the selected groove-style coupling manufacturers' product specifications. Consult the groove coupling manufacturer for temperature and pressure limitations.

Schedule 80 CPVC piping is available with grooved ends designed for use with Victaulic® Style 75, Style 77, or equivalent flexible-style couplings. Only use flexible-style metallic grooved couplings as rigid-style couplings exert a compressive/shear load to the CPVC pipe, resulting in failure.

Consult the manufacturer of the flexible-style metallic grooved coupling for specific information regarding the groove depth and width.

Note: Temperature and pressure ratings and limitations are dependent on the grooved coupling manufacturer's specifications.

Note: Use a gasket lubricant to prevent pinching the gasket and to assist the seating and alignment processes during assembly. Certain lubricants may contain a petroleum base or other chemicals, which will cause damage to the CPVC pipe, gasket, and adapter. Verify the lubricant suitability with the lubricant manufacturer prior to use.

Note: As an added precaution, add a hanger or support near the grooved coupling adapter connection on either side of the coupling.

Notes

Chapter 5: Installation

Aboveground Installations

Always design and install the system to compensate for thermal expansion and contraction movement. This is particularly true for aboveground applications installed outdoors and within unoccupied buildings with significant ambient temperature swings.

For example, a system installed in an unoccupied (i.e. unheated) building during the winter months will expand considerably when temperatures rise. The direct opposite is true for systems installed at higher ambient temperatures where temperatures may fall considerably after installation. It is important to address this with proper system design to compensate for movement generated as the result of thermal expansion and/or contraction of the piping.

Uponor ChlorFIT piping products have been used successfully in outdoor applications when proper recommendations are followed. As with any other piping, protect the system from freezing with pipe insulation, antifreeze solutions, and heat-trace tapes. Always consult the manufacturers of these products for suitability and compatibility with Schedule 80 CPVC prior to use.

Sunlight (UV) Exposure

For piping systems exposed to direct ultraviolet (UV) sunlight, cover with a light-colored acrylic or latex paint that is chemically compatible with Schedule 80 CPVC products. Confirm compatibility with the paint manufacturer. **DO NOT** use oil-based paints.

While covering the pipe with light-colored acrylic or latex plain can greatly reduce the damaging effects of UV exposure, it is important to consider the effects of expansion/contraction caused by heat absorption in outdoor applications. It is important to design and install the system to reduce the effects of movement due to thermal expansion/contraction.

Schedule 80 CPVC pipe and fittings have been used extensively outdoors and are resistant to weathering but may have some surface degradation from intense and prolonged exposure to UV rays in sunlight. This degradation is a surface effect which reduces the impact rating but has no effect on the temperature capability, chemical resistance, or pressure rating of the pipe. To eliminate the reduced impact rating, remove the affected surface area and covering with a good bonding exterior latex paint.

For maximum performance, refer to the following recommendations:

- Only paint the pipe if thermal expansion is not too great [i.e., the temperature differential is not more than 50°F (10°C)].
- Ensure the paint is a high-pigment-content, exterior-grade latex.
- Before painting, perform a light sanding to greatly aid in bonding to the pipe.
- Avoid any chemical pretreatment procedure or ingredients harmful to Schedule 80 CPVC.

Apply the paint in several coats to create an opaque covering. If the pipe and fittings are prepared properly for painting, a good grade of exterior latex should last for many years. White or light-colored paint works best as it offers a more reflective surface.

Aboveground Support Installations

When installing Uponor ChlorFIT piping systems aboveground, ensure proper support to maintain pipe alignment, prevent sagging, prevent grade reversal, and support changes in directions.

Support spacing is a function of:

- Pipe size
- Operating temperature
- Location of heavy valves or fittings
- Mechanical properties of the piping
- Specific gravity of water

Horizontal runs require the use of hangers with additional support required as temperatures increase. For continuous support, use smooth structural angles or channels. Where pipe is exposed to impact damage, install protective shields.

When dealing with expansion and contraction, ensure supports do not restrict axial movement, and file smooth any sharp edges or burrs in all supports.

Common practice is to install suitable hangers within 2 ft. of each side of a pipe joint. Support changes in direction as close as possible to the fitting to reduce tensional stress without restricting movement. Independently support heavy system components such as valves, flanged assemblies, tees, and other forms of concentrated stress loads. In addition, adequately brace valves to prevent movement and stress loads. Refer to **Table 5-1** for appropriate horizontal support distances.

Horizontal Support Distances

Size	Schedule 80 Corzan CPVC					
	73°F (23°C)	100°F (38°C)	120°F (49°C)	140°F (60°C)	160°F (72°C)	180°F (83°C)
½"	5.5	5.0	4.5	4.5	3.0	2.5
¾"	5.5	5.5	5.0	4.5	3.0	2.5
1"	6.0	6.0	5.5	5.0	3.5	3.0
1¼"	6.5	6.0	6.0	5.5	3.5	3.0
1½"	7.0	6.5	6.0	5.5	3.5	3.5
2"	7.0	7.0	6.5	6.0	4.0	3.5
2½"	8.0	7.5	7.5	6.5	4.5	4.0
3"	8.0	8.0	7.5	7.0	4.5	4.0
3½"	8.5	8.5	8.0	7.5	5.0	4.5
4"	9.0	8.5	8.5	7.5	5.0	4.5
5"	10.0	9.5	9.0	8.0	5.5	5.0
6"	10.0	9.5	9.0	8.0	5.5	5.0
8"	11.0	10.5	10.0	9.0	6.0	5.5

Table 5-1: Horizontal support distances

Horizontal Pipe Supports and Brackets

Support piping runs at specific intervals are based upon the pipe diameter and the temperature of the fluid inside the piping. Determining pipe support centers is based on the permissible amount of deflection of the pipe between two brackets and based on a permissible deflection of maximum 0.01" between two brackets.

Pipe Bracket Spacing for Fluids with Specific Gravity ≤ 1.0 (62.4 lb./ft.^{3})

When conveying fluids with a specific gravity exceeding 1g/cm^3, adjust pipe spacing by dividing the support spacing by the specific gravity.

Installing Closely Spaced Pipe Brackets

For small-diameter horizontal piping installation, continuous support may be more advantageous and economical than pipe brackets, especially in higher-temperature ranges. Install V-shaped or U-shaped support made of metal or heat-resistant plastic material for best results.

Pipe Bracket Requirements

The bracket inside diameter must be greater than the pipe outside diameter to allow pipe length changes at the specified points. Ensure the inside edges of the pipe brackets do not damage the pipe surface. GF offers plastic pipe brackets that meet these requirements.

Arrangement of Fixed Brackets

A fixed point should not be a compressive force to hold the pipe, but rather a design anchor that withstands the axial load. If positioning the pipe bracket directly beside a fitting, the length change of the pipeline is limited to one direction only (one-sided fixed point). If it is, as in most cases, necessary to control the length change of the pipeline in both directions, position the pipe bracket between two fittings. Ensure the pipe bracket is firmly mounted and robust enough to take up the force arising from the length change in the pipeline.

Note: Hanger-type brackets are not suitable as fixed points.

Vertical Supports

In multiple floor or high-rise buildings, designers and installers should be aware and consider expansion and contraction in vertical applications. Vertical riser applications will expand (and contract) similar to horizontal piping. See **Chapter 3**, **page 21** for information on ChlorFIT expansion rates.

Instead of using expansion loops, which can be expensive and time consuming to install, consider using fixed anchor points with ChlorFIT piping to help control the expansion and contraction using the following methods/options:

- Install riser clamps on both sides of the floor on even or odd floor numbers with a single riser clamp alternating on the floors in between. See **Figure 5-1**.

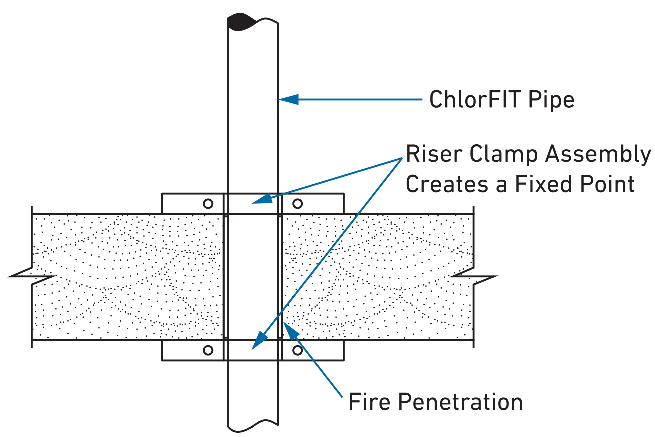


Figure 5-1: Riser clamp installation

- The other option would be to anchor the riser clamp at the bottom of the riser to the floor on alternating levels. See **Figure 5-2**.

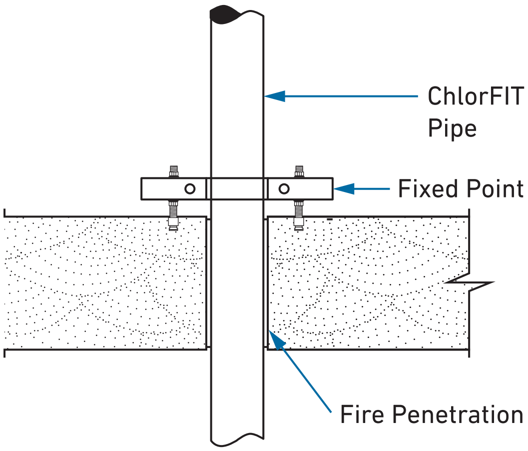


Figure 5-2: Anchor clamp at bottom of riser

Important: Ensure the riser clamps or supports do not exert an excessive force on the piping that squeezes the pipe or causes it to deform.

Ensure horizontal takeoffs from the riser are independently supported and located as close to the riser clamp as possible. Use offset configurations with at least one change in direction to tie horizontal runs into the riser in close proximity to the riser clamp. Offset configurations between the riser tee and the wall entry will minimize stress on the horizontal connection, should riser movement occur.

Caution: Do not use a single horizontal run from the riser tee through the wall on systems conveying fluids at elevated temperatures.

Maintain vertical piping in straight alignment with supports at proper intervals with a midstory guide, as specified by the design engineer, to allow for movement from thermal expansion and contraction of the piping. Always use midstory guides on small-diameter pipe (less than 2"), particularly on hot water lines, to minimize deflection caused by thermal expansion.

Note: These guidelines are for vertical risers only. For horizontal runs, use expansion loops, offsets, bends, and other means to compensate for movement due to changes in temperature.

Anchors and Guides

Anchors in a piping system direct movement of pipe within a defined reference frame. At the anchoring point, there is no axial or transverse movement. Guides allow axial pipe movement but prevent transverse movement. Design anchoring and guides to provide the required function without point loading the pipe. Use guides and anchors along with expansion joints, on long runs, and on directional changes in piping.

Typical Anchor Arrangements

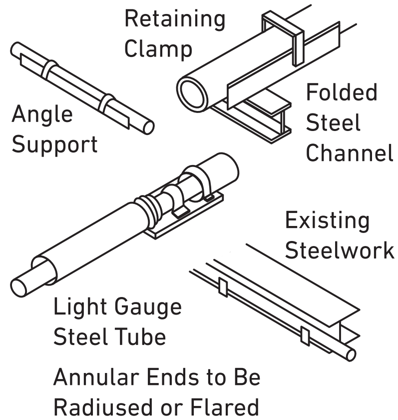
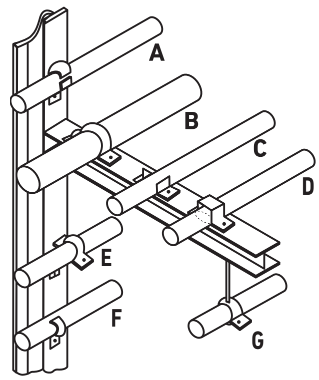


Figure 5-3: Continuous support examples



A: Pipe Clip (Vertical)

B: U-Clamp

C: Pipe Clip Horizontal

D: Roller Carrier

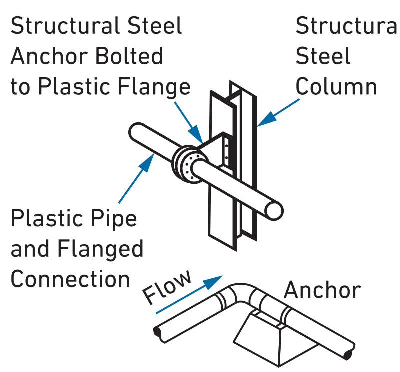
E: Angle Bracket with U-Clamp

F: Clamp (Vertical)

G: Suspending Ring Clamp

Figure 5-4: Typical support arrangements

Note: Ensure pipes can move axially.



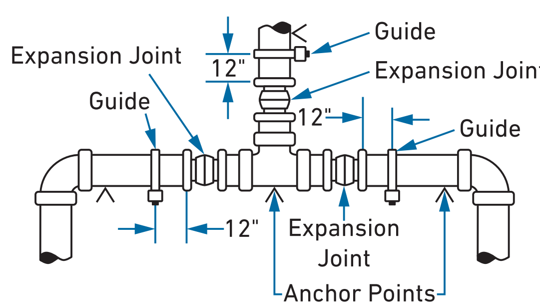


Figure 5-5: Guides and anchors examples

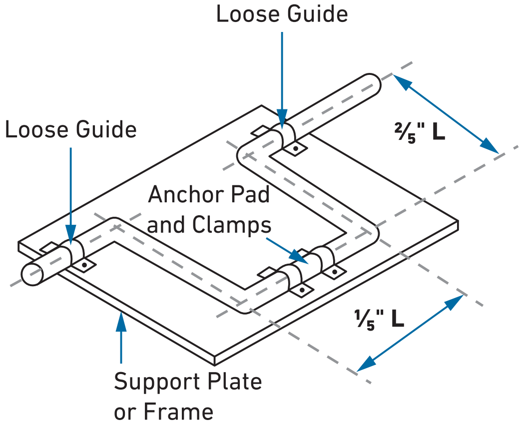


Figure 5-6: Typical anchor method

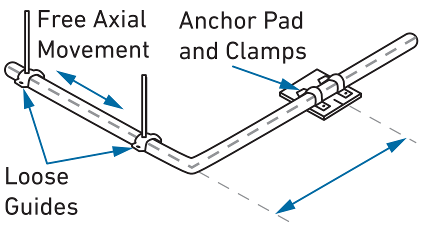


Figure 5-7: Typical anchor method for a change in direction

Underground Installations

Install underground piping in accordance with any applicable regulations, ordinances, and codes. Since piping is installed in a wide range of subsoils, it is important to consider local pipe-laying techniques that may provide a solution to a particular pipe-bedding issue.

Refer to the following information as a general guide for Schedule 80 CPVC underground installations joined via solvent-cement welding.

Storage, Handling, and Inspection

Do not expose pipe or fittings to elevated temperatures during shipping and/or storage. Exposure to excessive temperatures will result in pipe distortion/deformation. Do not drop pipes, allow objects to drop on pipes, or subject pipes to external loads. Schedule 80 CPVC can be damaged by abrasion and gouging. Do not drag pipes across the ground or over obstacles. Avoid impacts, such as dropping from sizable heights and rough handling, particularly in cold weather. Inspect the product for any scratches, splits, or gouges that may have occurred from improper handling or storage. If found, cut out and discard the sections.

Trench Construction

For buried, non-pressure applications, conduct trench construction, bedding, haunching, initial backfill, compaction, and final backfill as required by the project engineer or by following ASTM D2321 **Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications**.

For pressure applications, when details are not provided by the project engineer, follow ASTM D2774 **Standard Practice for Underground Installation of Thermoplastic Pressure Piping**. The trench should be of adequate width to allow convenient installation while also being as narrow as possible. Achieve minimum trench widths by connecting pipe outside the trench and lowering it into the trench (after connection strength is achieved). Wider trenches are necessary if connecting pipe in the trench or where thermal expansion and contraction is a factor.

Refer to **Chapter 4** for recommended installation techniques and set and cure times for solvent-cemented joints. Do not lower into the trench until connection strength is achieved.

Determine trench depth based on intended service and local conditions. For pipe conveying liquids susceptible to freezing, bury the system no less than 12" below the maximum frost level. Ensure a minimum cover of 24" for permanent lines subjected to heavy traffic. For light traffic, 12" to 18" is normally sufficient for small-diameter pipe (less than 3"). For larger pipe sizes, calculate bearing stresses to determine the required cover. Always follow local, state, and national codes.

Install a metal or concrete casing around pipe beneath surfaces subject to heavy weight or constant traffic, such as roadways and railroad tracks. Design and install piping systems to ensure proper handling of anticipated loads.

Ensure the trench bottom is continuous, relatively smooth, and free of rocks. If encountering ledge rock, hardpan, or boulders, pad the trench bottom using a minimum 4" of tamped earth or sand beneath the pipe as a cushion and protection from damage. Maintain sufficient cover to keep external stress levels below acceptable design stresses.

Pipe Snaking

For small-diameter piping systems less than 3", snake the pipe to compensate for thermal expansion and contraction in hot weather. This may also apply to larger-diameter piping under specific applications and site conditions.

After solvent welding the pipe and allowing to set properly, snake the pipe beside the trench and allow for appropriate cure time.

Note: Be especially careful not to apply any stress that will disturb the joint before it properly cures.

This snaking is necessary to allow for any anticipated thermal contraction that will take place in the newly joined pipeline. Refer to **Chapter 3** for more information on thermal expansion and contraction.

Snaking is particularly necessary on the lengths that have been solvent welded during hot daytime temperatures, because the drying time will extend through the cool of the night when thermal contraction of the pipe could stress the joints to the point of pull out.

This snaking is also especially necessary with pipe that is laid in its trench (necessitating wider trenches than recommended) and is backfilled with cool earth before the joints are thoroughly dry.

See **Figure 5-8** and **Table 5-2** for information regarding loop lengths and loop offsets.

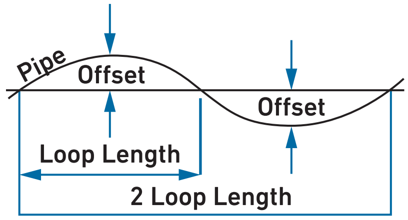


Figure 5-8: Loop offset for pipe diameters less than 3"

Loop Offset (in.)	Maximum Temperature Variation Between Solvent Welding and Final Use (°F)									
Length (ft.)	**10°F**	**20°F**	**30°F**	**40°F**	**50°F**	**60°F**	**70°F**	**80°F**	**90°F**	**100°F**
20	3	4	5	5	6	6	7	7	8	8
50	7	9	11	13	14	16	17	18	19	20
100	13	18	22	26	29	32	35	37	40	42

Loop Offset (cm.)	Maximum Temperature Variation Between Solvent Welding and Final Use (°F)									
Length (m)	**6°C**	**11°C**	**17°C**	**22°C**	**28°C**	**33°C**	**39°C**	**44°C**	**50°C**	**56°C**
6	3	4	5	5	6	6	7	7	8	8
15	7	9	11	13	14	16	17	18	19	20
30	13	18	22	26	29	32	35	37	40	42

Table 5-2: Loop offset in relation to loop length and maximum temperature variation between solvent welding and final use

Note: Expansion and contraction could become excessive in systems operating at near or the maximum allowable temperature ranges with intermittent flow and buried lines. In these instances, do not snake the lines. Instead, use properly installed expansion joints installed within suitable concrete pits. Use a section of larger-diameter PVC pipe or other suitable sleeve over the carrier pipe to pass through the concrete wall. This will minimize the potential for damage to the carrier pipe as the result of thermal expansion/contraction movement. Install suitable anchor expansion joints independently of the carrier line. Use axial guides to direct movement into the expansion joint.

Bedding and Haunching

To uniformly and continuously support the pipe throughout its entire length, ensure proper bedding and haunching materials that are dependent on local soil conditions and type. Follow classes of embedment and backfill materials stated in ASTM D2321.

Ensure the trench bottom is continuous, relatively smooth, and free of rocks. When encountering ledge rock, hardpan, or boulders, pad the trench bottom with proper bedding using a minimum of 6" of suitable material beneath the pipe as a cushion and to protect from damage.

Note: For belled-end pipe, provide bell holes in bedding no larger than necessary to ensure uniform pipe support.

Note: Avoid threaded connections in underground applications.

When transitioning to alternate materials, use flanges with a suitable gasket. For vertical transitions from below-ground systems to aboveground connections, follow aboveground installation procedures regarding compensating for thermal expansion/contraction, weatherability, and proper support recommendations. Independently support valves and other concentrated weight loads. Avoid excessive bending of pipe and excessive deflection of pipe and joints, which can reduce pressure-bearing capability and cause failure.

Place initial backfill by methods that will not disturb or damage the pipe. Work in and hand tamp the haunching material placed in the area between the bedding and the underside of the pipe prior to placing and compacting the remainder of the embedment material in the pipe zone. Install and compact bedding materials in a maximum of 6"-thick layers within the pipe zone. Ensure compaction techniques and equipment do not contact or damage the pipe. Refer to **Figures 5-9** and **5-10** for details.

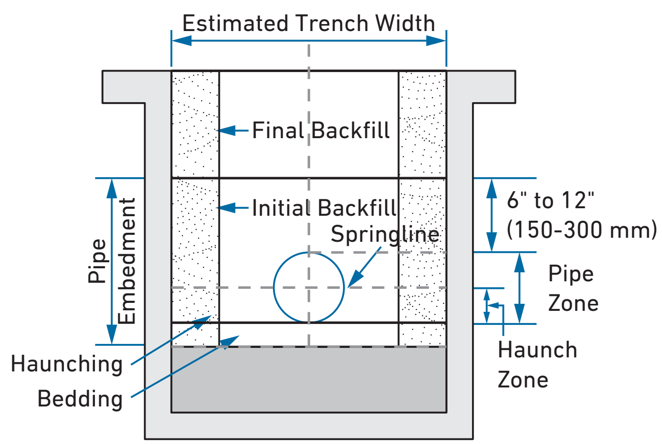


Figure 5-9: Bedding, haunching, and backfill example

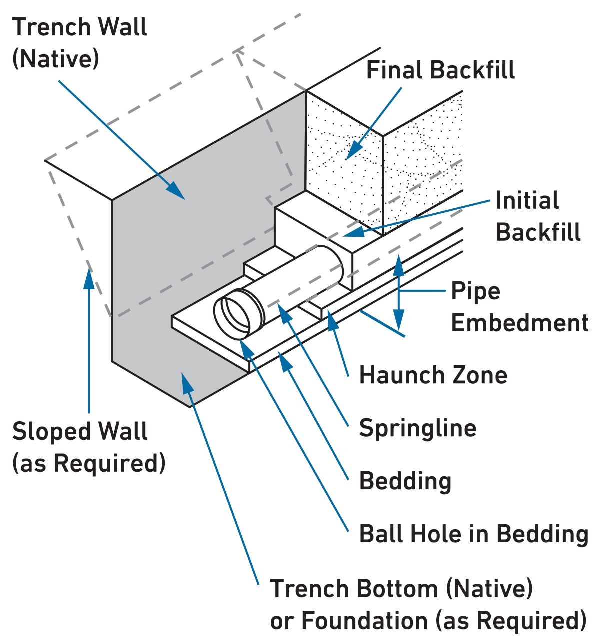


Figure 5-10: Example of fill layers in a trench

Backfilling

Where possible, thoroughly inspect and test underground pipe for leaks prior to backfilling. The pipe should be uniformly and continuously supported over its entire length on firm, stable material. Do not use blocking to change pipe grade or intermittently support pipe across excavated sections. When pipe is installed in a wide range of subsoils, ensure the soils are stable and applied in such a manner as to physically shield the pipe from damage.

Be aware of local pipe-laying experiences that may indicate particular pipe bedding issues. Place and compact initial backfill materials in layers. Ensure the backfill is free of rocks, ensuring particle sizes ½" or less. Sufficiently compact each layer to uniformly develop lateral passive soil forces during the backfill operations. It may be necessary to have the pipe under water pressure, 15 to 25 PSI, during backfilling.

Place and spread final backfill in uniform layers to completely fill the trench. Remove large or sharp rocks, frozen clods, and other debris greater than 3".

Maintain sufficient cover to keep external stress levels below acceptable design stresses. Only use rolling equipment or heavy tampers to consolidate the final backfill. Always follow local, state, and national codes.

Cold-Temperature Installations

Uponor ChlorFIT is a rigid thermoplastic material. As such, pipe stiffness increases, and impact resistance decreases in colder temperature environments, making the pipe more susceptible to damage. Refer to these guidelines to help minimize the potential for damage in cold-weather installations.

Impact resistance and ductility decrease at colder temperatures. Additionally, a drop in temperature will cause the piping to contract. This must be addressed with proper system design.

Due to the coefficient of thermal expansion for Schedule 80 CPVC, a 20-ft. length of pipe will contract approximately ⅞" when cooled from 95°F to -5°F (35°C to -21°C). Since a decrease in temperature does not reduce pressure-bearing capacity, the pipe is suitable for use at colder temperatures, provided the fluid medium is protected from freezing, consideration is given to the effects of expansion and contraction, and additional care and attention are given during handling, installation, and operation of the system to prevent damage caused by impact or other mechanical forces.

Burial Depth

When installing piping underground, an external load will deflect the pipe (i.e., its sides will move outward and slightly downward). If burying the pipe in supportive soil, the soil stiffness will help support the pipe. This is how a pipe carries external loads while buried.

The support from the embedded soil and the pipe stiffness forms a combination to resist deflection from external loads. The pipe resistance to deflection in an unburied state is measured by the pipe's stiffness. The excellent quality of Uponor ChlorFIT means it has a high pipe stiffness value. In general, the greater the pipe stiffness values, the higher the load capacity.

Due to the ability of Uponor ChlorFIT pipes to flex before they break, a limit is placed on pipe diametric deflection. This limit is expressed in terms of percentage reduction in diameter due to external loading. The maximum allowable diametric deflection for Uponor ChlorFIT is 5%. Any deflection greater than 5% could lead to the failure of a piping system.

One method commonly used to estimate pipe deflection based on its burial depth is the Modified Iowa Equation, shown in **Equation 5-1**. A simplified version of the equation is presented below where 5% deflection is the limiting factor. **Tables 5-3** through **5-5** give reference values of Prism Load Soil Pressures, Live Load, and Modulus of Soil Reaction factors for use in the below equation.

Equation 5-1: Calculating Schedule 80 Corzan CPVC Deflection %

$$y = \frac{10\,(P+L)}{0.149\,(PS) + 0.061\,E'}$$

Where:

y = Percent deflection of the buried pipe's outside diameter - % (%) (5% is the maximum allowable deflection per ASTM D2665)

P = Prism load soil pressure on the buried pipe from the weight of the soil above it - lb./in.^{2} (MPa) (see values in **Table 5-3**)

L = Live load on buried pipe from traffic on the surface above it - lb./in.^{2} (MPa) (see values in **Table 5-4**)

PS = Pipe Stiffness to resist deflection in an unburied state per ASTM D2412 - lb./in.^{2} (MPa)

E' = Modulus of soil reaction on top of buried pipe - lb./in.^{2} (MPa) (see values in **Table 5-5**)

Equation 7-1 Example

4" Uponor ChlorFIT is to be buried 10 ft. under E802 railway traffic. The soil is coarse grained with little to no fines and with a high proctor and 110 lbs./ft.^{3} soil density. Will this be an appropriate application for 4" Uponor ChlorFIT?

P = 7.64 PSI

L = 7.64 PSI

PS = 996 PSI

E' = 3,000 PSI

$$P = \frac{10 \bullet (7.64\text{ psi} + 7.64\text{ psi})}{(0.149 \bullet 996\text{ psi}) + (0.061 \bullet 3000\text{ psi})}$$

P = 0.46% ± 5%

Height of Soil Cover (ft.)	Prism Load Soil Pressure (PSI)					
	Soil Unit Weight (lb./ft.³)					
	100	110	120	130	140	150
1	0.69	0.76	0.83	0.90	0.97	1.04
2	1.39	1.53	1.67	1.81	1.94	2.08
3	2.08	2.29	2.50	2.71	2.92	3.13
4	2.78	3.06	3.33	3.61	3.89	4.17
5	3.47	3.82	4.17	4.51	4.86	5.21
6	4.17	4.58	5.00	5.42	5.83	6.25
7	4.86	5.35	5.83	6.32	6.81	7.29
8	5.56	6.11	6.67	7.22	7.78	8.33
9	6.25	6.88	7.50	8.13	8.75	9.38
10	6.94	7.64	8.33	9.03	9.72	10.42
12	8.33	9.17	10.00	10.83	11.67	12.50
14	9.72	10.69	11.67	12.64	13.61	14.58
16	11.11	12.22	13.33	14.44	15.56	16.67
18	12.50	13.75	15.00	16.25	17.50	18.75
20	13.89	15.28	16.67	18.06	19.44	20.83
25	17.36	19.10	20.83	22.57	24.31	26.04
30	20.83	22.92	25.00	27.08	29.17	31.25
35	24.31	26.74	29.17	31.60	34.03	36.46
40	27.78	30.56	33.33	36.11	38.89	41.67
45	31.25	34.38	37.50	40.63	43.75	46.88
50	34.72	38.19	41.67	45.14	48.61	52.08

Table 5-3: Prism load soil pressure (soil density) (P)

Height of Cover (ft.)	Live Load (PSI)		
	Highway H201	Railway E802	Airport 3
1	12.50		
2	5.56	26.39	13.14
3	4.17	23.61	12.28
4	2.78	18.40	11.27
5	1.74	16.67	10.09
6	1.39	15.63	8.79
7	1.22	12.15	7.85
8	0.69	11.11	6.93
10	N	7.64	6.09
12	N	5.56	4.76
14	N	4.17	3.06
16	N	3.47	2.29
18	N	2.78	1.91
20	N	2.08	1.53
22	N	1.91	1.14
24	N	1.74	1.05
26	N	1.39	N
28	N	1.04	N
30	N	.069	N

Table 5-4: Live load on buried pipe (traffic load) (L)

Pipe Bedding Materials		E' for Degree of Connection of Pipe Zone Backfill, PSI (MPa)			
Soil Class	Soil Type (United Classification System per ASTM D2487)	Loose or Dumped	Slight <85% Proctor, <40% Relative Density	Moderate 85%-90% Proctor, 40%-70% Relative Density	High >95% Proctor, >70% Relative Density
Class V	"Fine-grained Soils (LL <50b) Soils with Medium to High Plasticity, CH, MH, MH-CH"	No Data Available; Consult a Professional Soils Engineer; Otherwise, Use E' = 0			
Class IV	"Fine-grained Soils (LL <50) Soils with Medium to No Plasticity, CL, ML, ML-CL, with Less Than 25% Coarse-grained Particles"	"50 (0.345)"	"200 (1.379)"	"400 (2.758)"	"1,000 (6.895)"
Class III	"Fine-grained Soils (LL <50) Soils with Medium to No Plasticity, CL, ML, ML-CL, with Less Than 25% Coarse-grained Particles"	"100 (0.689)"	"400 (2.758)"	"1,000 (6.895)"	"2,000 (13.790)"
Class II	"Coarse-grained Soils with Little or No Fines GW, GP, SW, SPc, Contains Less Than 12% Fines"	"200 (1.379)"	"1,000 (6.895)"	"2,000 (13.790)"	"3,000 (20.684)"
Class I	Crushed Rock	"1,000 (6.895)"	"3,000 (20.684)"	"3,000 (20.684)"	"3,000 (20.684)"
	Accuracy in Terms of Percentage Deflection	±2	±2	±1	±0.5

Table 5-5: Average values of modulus of soil reaction (soil type) (E')

To determine the allowable pipe burial depth, gather data from the provided tables to determine the pipe dimension, soil density, traffic load, soil type, and compaction density of embedment soil. Then, use the obtained values in the Modified Iowa Equation to determine the predicted percentage of pipe deflection.

GF Building Flow Solutions does not recommend the use of Uponor ChlorFIT when the pipe diameter deflects more than 5%. Therefore, GF Building Flow Solutions does not recommend use of Uponor ChlorFIT when the percentage of deflection obtained through the Modified Iowa Equation is greater than 5%.

Pressure Testing

Only perform hydrostatic pressure testing (i.e., testing with water-filled lines) on Uponor ChlorFIT piping products. During pressure testing, take appropriate safety precautions to protect personnel and property from damage. Ensure the test pressure and duration meet local, state, and national requirements, as applicable. In the absence of any such requirements or regulations, refer to the following procedures to properly conduct a hydrostatic pressure test on newly installed Uponor ChlorFIT piping systems.

Ensure strict adherence to proper solvent cementing instructions as well as set and cure times to promote the highest system integrity prior to pressure testing. Pay particular attention to pipe sizes, temperature at installation time, and any temperature variations over the set and cure period.

1. Ensure all solvent-cemented connections are fully cured prior to filling the system with water.
2. Ensure pipe is adequately anchored/restrained to prevent movement during testing.
3. Do not perform testing until authorized and witnessed by the responsible inspector.
4. Vent all entrapped air when filling the system with water. Entrapped air is a major cause of excessive surge pressures that result in burst failures of CPVC piping systems.
5. Ensure the system has an air release and air/vacuum relief valves at high points to vent air during filling as well as during normal system operation.
6. Fill the system slowly with water, venting air from valves at piping run ends and at elevations during the filling process. Whether using a hydraulic hand pump or available water line, any slow buildup of gauge pressure or any rapidly fluctuating gauge needle on a completely liquid-filled system is a strong indication entrapped air is present within the system. Should this occur, immediately release pressure and rebleed the line. Failure to do so can lead to a catastrophic failure when the water column suddenly accelerates by the rapidly decompressing air should a faulty joint separate or other failure occur.
7. Ensure the test does not exceed the pressure rating of the lowest-rated component in the piping system (valve, union, or flange). Test the system at 150% of the designed operational pressure (i.e., if the system is designed to operate at 80 PSI, the test will be done at 120 PSI).
8. Allow one hour for the system to stabilize after reaching the desired pressure. After the hour, in case of pressure drop, increase pressure back to the desired amount, and hold for 30 minutes. If the pressure drops by more than 6%, check the system for leaks.
9. A test period of two hours is usually considered satisfactory to demonstrate system integrity.
10. If a leak is found, relieve the pressure, replace the failed section, allow for proper cure time, and retest the system.

Note: Test large and/or complex systems in segments as they are installed to permit evaluation and correction of improper installation techniques or other deficiencies as the project progresses.

Warning: DO NOT use compressed air or gas. This can cause explosive failures, resulting in system damage, severe bodily injury, or death.

Chapter 6: Commissioning, Operation, and Maintenance

Overview

The purpose of this section is to provide instruction on the minimum commissioning, maintenance, and inspection requirements to help the Uponor ChlorFIT system meet or exceed its service life expectancy. Reviewing the commissioning report and confirming the design recommendations in this manual can help drive long-term system success.

Operation and Maintenance Plan

Work with a licensed contractor to develop and document a thorough operation and maintenance plan that includes all equipment involved in regulating system temperature, pressure, and velocity. The program must include the following recommendations as well as manufacturer recommendations for the other equipment installed in the piping system.

Note that proper documentation of the system operation and maintenance plan is important for future reference, should a performance issue arise.

Preventive Maintenance Guidelines

Refer to each section for proper preventive maintenance guidelines.

Initial Commissioning

Ensure a licensed professional performs and documents a formal commissioning of the piping system. If, after initial commissioning, any changes are made to the piping system which may impact temperature, pressure, or velocity, document the changes and the recommissioning of the system. This will help ensure consistent performance and provide reference in the event of a performance issue. This includes, but is not limited to, changes in system operating conditions as well as system components.

Plan Requirements

Ensure the maintenance team develops a plan for regular inspections, monitoring, and maintenance of the system and its components. Inspection should include, but is not limited to, all equipment involved in regulating system temperature, pressure, and velocity. Maintenance should include, but is not limited to, Uponor ChlorFIT manufacturers' recommendations as well as other manufacturers' recommendations for all system components.

System Inspection and Monitoring

Integrate data points for temperature, pressure, and velocity into the building management system (BMS). This will trigger an alarm when system conditions are outside the proper operating parameters.

It is also necessary to inspect and monitor the system to ensure it is operating in conformity with all code requirements regarding proper system and equipment maintenance and operation, including, but not limited to, temperature, pressure, and velocity. In instances where there is a difference between manufacturer recommendations and local or national code requirements, follow the more restrictive guidelines.

Temperature

Perform regular checks to ensure temperature-control devices, such as aquastats, mixing valves, etc., are functioning properly and delivering the correct water temperature to the system. Ensure the water temperature supply does not exceed the design and safety (anti-scald) limits without proper review and/or justification and does not exceed the maximum recommended temperature for the pipe or other components and materials. Refer to **Table 1-2** in **Chapter 1** for Uponor ChlorFIT temperature and pressure requirements.

Pressure

Review system pressure gauges to ensure system pressure has not increased without explanation. Do not exceed the maximum operating pressure of 80 PSI for the system.

Refer to **Table 1-2** in **Chapter 1** to review Uponor ChlorFIT temperature and pressure requirements.

Pressure surges resulting from thermal expansion, water hammer, pump cycling, and variable incoming water supply, etc., can reduce the service life of system components. This includes, but is not limited to, pumps, pressure reducing valves (PRVs), valves, piping, fittings, expansion tanks, and other devices.

Refer to the following recommendations in an effort to prevent pressure surges from damaging components of an Uponor ChlorFIT piping system:

- **Diaphragm expansion tanks:** Ensure the bladder (or diaphragm) is in working condition and the tank is maintaining the correct fill pressure.
- **Compression expansion tanks:** Check the expansion tank to ensure it is maintaining the air cushion and has not become waterlogged.

- **Relief valves:** Check and cycle all relief valves installed within the system and provide the proper limit for the design system pressure. Refer to the temperature and pressure tables in **Chapter 3** to ensure maximum pressures are not exceeded.
- **Backflow preventers:** Test the backflow preventer and check for changes in gauge movement.
- **Water hammer:** If the system is experiencing water hammer, install water hammer arrestors.
- **Valves (shutoff, balancing, etc.):** Balance and exercise pressure balancing valves periodically, and make sure the adjustable setting does not exceed the maximum pressure in the system. Operate valves in the piping system to ensure proper operation and confirm their ability to close and isolate the piping system during an emergency. Also, ensure valves have not seized up due to scale buildup.
- **Booster pumps:** Review and test booster pump operation for optimal performance and regulation to the set pressure. In commercial installations, verify the pressure is below the maximum operating pressure at the lowest level of each pressure zone. Ensure pressure consistency from the pumps for best system performance.

Domestic Hot Water Recirculation and Velocity

Review the recirculation pump operation and verify water flow in the continuous-flow portion of the recirculation line does not exceed 5 feet per second (ft./sec.). Ensure the water temperature within that line does not exceed the pressure and temperature ratings for the specific pipe size.

If a circuit setter or other balancing device is not installed, be sure to install pressure gauges on the inlet and the outlet of the recirculating pump. The gauges will provide data as to where the pump is operating on its curve.

For example:

Outlet pressure gauge reads 22 PSI

Inlet pressure gauge reads 13 PSI

Pressure differential is 9 PSI (22 PSI – 13 PSI = 9)

Multiply differential pressure by 2.3066
for feet of head = 20.8 ft.

Refer to the recirculation manufacturer's pump curve. Find 20.8 ft. on the curve and look for the resulting gallons per minute (GPM). For this example, we will assume 8 GPM.

Recirculation line is 1" Uponor ChlorFIT.

Convert GPM to feet per second (V):

$V = (0.4085 \text{ x GPM})/\text{pipe diameter ID}^2$

$V = (0.4085 \text{ x } 8)/(0.957)^2$

$V = (3.3)/(0.92)$

V = 3.6 feet per second (ft./sec.)

This recirculation line will be operating below the recommended limit of 5 ft./sec., so the pipe size and flow rate is acceptable.

Leaks

Check for signs of leaks, including dried water spots under relief valves, as well as moisture, mold, and mildew on or around the piping system.

System Disinfection

Verify the disinfection process, chemical agents, and limits align with local or national code. Visit the **GF Online Chemical Resistance Tool** found at gfps.com/int/en/downloads-tools/online-tools/chemical-resistance.html for chemical compatibility information.

General Maintenance

Building maintenance staff and/or plumbing/HVAC maintenance staff should perform routine inspection of piping systems within the building. Ensure the system operating conditions do not exceed the maximum allowable Uponor ChlorFIT operating temperature and pressure ratings. Make system adjustments as needed and contact GF Building Flow Solutions for further assistance if operating conditions exceed limitations.

Ensure no incompatible materials or chemicals come into contact with the Uponor ChlorFIT system. Refer to **Chapter 2** of this manual and visit the **GF Online Chemical Resistance Tool** found at gfps.com/int/en/downloads-tools/online-tools/chemical-resistance.html for chemical compatibility information.

Do not hang other piping systems, accessories, or building elements from the Uponor ChlorFIT system. Properly anchor and support all other systems, accessories, and building materials in accordance with local plumbing and building codes.

Ensure no electrical wires or data cabling are wrapped around or in contact with Uponor ChlorFIT pipe and fittings. The plasticizers contained in the plastic jackets of these wires and cables may not be compatible with Uponor ChlorFIT. Remove any wires that are in contact with the Uponor ChlorFIT piping system and contact GF Building Flow Solutions for further assistance.

Ensure Uponor ChlorFIT pipe maintains straight alignment. Do not bend or snake the pipe after commissioning the system. Movement after installation signifies that expansion and contraction forces may not be properly accounted for in the piping system. This movement can cause excessive stresses on solvent-welded joints, flange connections, pipes, fittings, and lateral branch lines. Contact GF Building Flow Solutions for recommendations and assistance if this occurs.

Operation and Maintenance Plan

Aging of CPVC Materials

Like all piping materials, Uponor ChlorFIT ages during its operating life. This aging can result in changes to physical characteristics such as increased brittleness and reduced impact resistance. As a result, avoid any forcible contact or impact with the piping system to reduce the chance of cracks or fractures occurring.

System Repair

Inspect pipes for any damage such as cracking and deep gouges. Locate the end of any pipe cracks and be sure to cut at least 6" beyond the crack line to ensure it is removed.

Carefully inspect any fittings for damage and remove and replace them accordingly.

Take additional precautions when modifying or repairing aged Uponor ChlorFIT products as they may be subject to a reduction in impact resistance (increased brittleness), making them more prone to cracking.

Make repairs by solvent welding new sections of pipe and fittings. Note that installation conditions during a repair vary greatly when compared to a new installation. Repairs or cut-ins to an existing system are typically done in confined spaces, on closed-end piping systems, and often have more humidity present. All of these factors can inhibit the evaporation of the solvent, leading to increased set and cure times. As such, it is important to increase the set and cure times by 50% for repairs or cut ins.

Appendix A: Fluid Properties

100% Water

Temperature °F (°C)	Fluid Density (lb./ft.3)	Dynamic Viscosity [lbm/(ft. • sec.)]
	ρ	μ
40 (4.44)	62.42	1.31E-03
45 (7.22)	62.42	1.09E-03
50 (10)	62.41	8.78E-04
55 (12.78)	62.39	8.16E-04
60 (15.56)	62.36	7.54E-04
65 (18.33)	62.33	7.05E-04
70 (21.11)	62.30	6.56E-04
80 (26.67)	62.22	5.76E-04
90 (32.22)	62.12	5.12E-04
100 (37.77)	62.00	4.58E-04
110 (43.33)	61.86	4.13E-04
120 (48.89)	61.71	3.74E-04
130 (54.44)	61.55	3.42E-04
140 (60)	61.38	3.14E-04
150 (65.56)	61.19	2.89E-04
160 (71.11)	60.99	2.68E-04
170 (76.67)	60.79	2.48E-04
180 (82.22)	60.57	2.32E-04
190 (87.78)	60.35	2.17E-04
200 (93.33)	60.12	2.04E-04

30% Propylene Glycol

Temperature °F (°C)	Fluid Density (lb./ft.3)	Dynamic Viscosity [lbm/(ft. • sec),]	Feet of Water Conversion
	ρ	μ	
40 (4.44)	64.67	3.86E-03	1.0360
45 (7.22)	64.60	3.45E-03	1.0350
50 (10)	64.53	3.04E-03	1.0340
55 (12.78)	64.46	2.73E-03	1.0333
60 (15.56)	64.39	2.43E-03	1.0326
65 (18.33)	64.32	2.20E-03	1.0318
70 (21.11)	64.24	1.98E-03	1.0311
80 (26.67)	64.08	1.63E-03	1.0299
90 (32.22)	63.91	1.37E-03	1.0288
100 (37.77)	63.73	1.16E-03	1.0279
110 (43.33)	63.54	1.00E-03	1.0272
120 (48.89)	63.33	8.72E-04	1.0263
130 (54.44)	63.12	7.67E-04	1.0255
140 (60)	62.90	6.78E-04	1.0248
150 (65.56)	62.67	6.11E-04	1.0242
160 (71.11)	62.43	5.50E-04	1.0236
170 (76.67)	62.18	4.97E-04	1.0229
180 (82.22)	61.92	4.56E-04	1.0223
190 (87.78)	61.65	4.17E-04	1.0215
200 (93.33)	61.37	3.89E-04	1.0208

40% Propylene Glycol

Temperature °F (°C)	Fluid Density (lb./ft.3)	Dynamic Viscosity [lbm/(ft. • sec.)]	Feet of Water Conversion
	ρ	μ	
40 (4.44)	65.21	6.45E-03	1.0360
45 (7.22)	65.14	5.65E-03	1.0350
50 (10)	65.06	4.84E-03	1.0340
55 (12.78)	64.98	4.29E-03	1.0333
60 (15.56)	64.90	3.74E-03	1.0326
65 (18.33)	64.82	3.34E-03	1.0318
70 (21.11)	64.73	2.94E-03	1.0311
80 (26.67)	64.55	2.37E-03	1.0299
90 (32.22)	64.36	1.94E-03	1.0288
100 (37.77)	64.16	1.61E-03	1.0279
110 (43.33)	63.95	1.36E-03	1.0272
120 (48.89)	63.74	1.16E-03	1.0263
130 (54.44)	63.51	1.01E-03	1.0255
140 (60)	63.27	8.81E-04	1.0248
150 (65.56)	63.02	7.81E-04	1.0242
160 (71.11)	62.76	7.00E-04	1.0236
170 (76.67)	62.49	6.25E-04	1.0229
180 (82.22)	62.22	5.72E-04	1.0223
190 (87.78)	61.93	5.17E-04	1.0215
200 (93.33)	61.63	4.78E-04	1.0208

50% Propylene Glycol

Temperature °F (°C)	Fluid Density (lb./ft.3)	Dynamic Viscosity [lbm/(ft. • sec.)]	Feet of Water Conversion
	ρ	μ	
40 (4.44)	65.67	9.54E-03	1.0521
45 (7.22)	65.59	8.33E-03	1.0508
50 (10)	65.50	7.12E-03	1.0495
55 (12.78)	65.42	6.28E-03	1.0486
60 (15.56)	65.33	5.44E-03	1.0476
65 (18.33)	65.24	4.84E-03	1.0466
70 (21.11)	65.14	4.24E-03	1.0456
80 (26.67)	64.95	3.37E-03	1.0439
90 (32.22)	64.74	2.73E-03	1.0422
100 (37.77)	64.53	2.24E-03	1.0408
110 (43.33)	64.30	1.88E-03	1.0394
120 (48.89)	64.06	1.59E-03	1.0381
130 (54.44)	63.82	1.36E-03	1.0369
140 (60)	63.57	1.18E-03	1.0357
150 (65.56)	63.30	1.03E-03	1.0345
160 (71.11)	63.03	9.08E-04	1.0334
170 (76.67)	62.74	8.06E-04	1.0321
180 (82.22)	62.45	7.19E-04	1.0310
190 (87.78)	62.14	6.53E-04	1.0297
200 (93.33)	61.83	5.92E-04	1.0284

Appendix B: Pressure Loss Charts (PSI)

½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
0.8	1.1	0.8	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6
0.9	1.2	1.0	0.9	0.9	0.8	0.8	0.8	0.8	0.7	0.7
1.0	1.4	1.2	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.9
1.1	1.5	1.4	1.3	1.2	1.2	1.1	1.1	1.1	1.0	1.0
1.2	1.6	1.7	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.2
1.3	1.8	1.9	1.7	1.6	1.6	1.5	1.5	1.4	1.4	1.4
1.4	1.9	2.2	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.5
1.5	2.1	2.4	2.2	2.1	2.0	1.9	1.9	1.8	1.8	1.7
1.6	2.2	2.7	2.4	2.3	2.2	2.2	2.1	2.0	2.0	1.9
1.7	2.3	3.0	2.7	2.6	2.5	2.4	2.3	2.3	2.2	2.2
1.8	2.5	3.3	3.0	2.9	2.8	2.7	2.6	2.5	2.5	2.4
1.9	2.6	3.6	3.3	3.1	3.0	2.9	2.8	2.8	2.7	2.6
2.0	2.7	4.0	3.6	3.4	3.3	3.2	3.1	3.0	3.0	2.9
2.1	2.9	4.3	3.9	3.7	3.6	3.5	3.4	3.3	3.2	3.1
2.2	3.0	4.7	4.2	4.0	3.9	3.8	3.7	3.6	3.5	3.4
2.3	3.2	5.1	4.5	4.4	4.2	4.1	4.0	3.9	3.8	3.7
2.4	3.3	5.4	4.9	4.7	4.5	4.4	4.3	4.2	4.1	4.0
2.5	3.4	5.8	5.3	5.1	4.9	4.7	4.6	4.5	4.4	4.3
2.6	3.6	6.2	5.6	5.4	5.2	5.1	4.9	4.8	4.7	4.6
2.7	3.7	6.7	6.0	5.8	5.6	5.4	5.3	5.1	5.0	4.9
2.8	3.8	7.1	6.4	6.2	6.0	5.8	5.6	5.5	5.4	5.2
2.9	4.0	7.5	6.8	6.6	6.3	6.1	6.0	5.8	5.7	5.6
3.0	4.1	8.0	7.2	7.0	6.7	6.5	6.3	6.2	6.0	5.9
3.1	4.2	8.5	7.7	7.4	7.1	6.9	6.7	6.6	6.4	6.3
3.2	4.4	9.0	8.1	7.8	7.5	7.3	7.1	6.9	6.8	6.6
3.3	4.5	9.4	8.5	8.2	8.0	7.7	7.5	7.3	7.2	7.0
3.4	4.7	10.0	9.0	8.7	8.4	8.1	7.9	7.7	7.6	7.4
3.5	4.8	10.5	9.5	9.1	8.8	8.6	8.3	8.1	8.0	7.8
3.6	4.9	11.0	9.9	9.6	9.3	9.0	8.8	8.5	8.4	8.2
3.7	5.1	11.5	10.4	10.1	9.7	9.4	9.2	9.0	8.8	8.6
3.8	5.2	12.1	10.9	10.5	10.2	9.9	9.6	9.4	9.2	9.0
3.9	5.3	12.6	11.4	11.0	10.7	10.4	10.1	9.9	9.6	9.4
4.0	5.5	13.2	12.0	11.5	11.2	10.8	10.6	10.3	10.1	9.9

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
0.8	1.1	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
0.9	1.2	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6
1.0	1.4	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7
1.1	1.5	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
1.2	1.6	1.2	1.1	1.1	1.1	1.1	1.1	1.0	1.0
1.3	1.8	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2
1.4	1.9	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.3
1.5	2.1	1.7	1.7	1.6	1.6	1.6	1.6	1.5	1.5
1.6	2.2	1.9	1.9	1.8	1.8	1.8	1.7	1.7	1.7
1.7	2.3	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9
1.8	2.5	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.1
1.9	2.6	2.6	2.5	2.5	2.4	2.4	2.4	2.3	2.3
2.0	2.7	2.8	2.8	2.7	2.7	2.6	2.6	2.6	2.5
2.1	2.9	3.1	3.0	3.0	2.9	2.9	2.8	2.8	2.8
2.2	3.0	3.3	3.3	3.2	3.2	3.1	3.1	3.0	3.0
2.3	3.2	3.6	3.6	3.5	3.4	3.4	3.3	3.3	3.2
2.4	3.3	3.9	3.8	3.8	3.7	3.6	3.6	3.5	3.5
2.5	3.4	4.2	4.1	4.0	4.0	3.9	3.9	3.8	3.8
2.6	3.6	4.5	4.4	4.3	4.3	4.2	4.1	4.1	4.0
2.7	3.7	4.8	4.7	4.6	4.6	4.5	4.4	4.4	4.3
2.8	3.8	5.1	5.0	5.0	4.9	4.8	4.7	4.7	4.6
2.9	4.0	5.5	5.4	5.3	5.2	5.1	5.0	5.0	4.9
3.0	4.1	5.8	5.7	5.6	5.5	5.4	5.4	5.3	5.2
3.1	4.2	6.2	6.0	5.9	5.8	5.8	5.7	5.6	5.5
3.2	4.4	6.5	6.4	6.3	6.2	6.1	6.0	5.9	5.9
3.3	4.5	6.9	6.8	6.6	6.5	6.4	6.4	6.3	6.2
3.4	4.7	7.3	7.1	7.0	6.9	6.8	6.7	6.6	6.5
3.5	4.8	7.6	7.5	7.4	7.3	7.2	7.1	7.0	6.9
3.6	4.9	8.0	7.9	7.8	7.6	7.5	7.4	7.3	7.3
3.7	5.1	8.4	8.3	8.2	8.0	7.9	7.8	7.7	7.6
3.8	5.2	8.8	8.7	8.5	8.4	8.3	8.2	8.1	8.0
3.9	5.3	9.3	9.1	9.0	8.8	8.7	8.6	8.5	8.4
4.0	5.5	9.7	9.5	9.4	9.2	9.1	9.0	8.9	8.8

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
4.1	5.6	13.8	12.5	12.1	11.7	11.3	11.0	10.8	10.5	10.3
4.2	5.8	14.4	13.0	12.6	12.2	11.8	11.5	11.2	11.0	10.8
4.3	5.9	15.0	13.6	13.1	12.7	12.3	12.0	11.7	11.5	11.2
4.4	6.0	15.6	14.2	13.7	13.2	12.8	12.5	12.2	12.0	11.7
4.5	6.2	16.2	14.7	14.2	13.8	13.4	13.0	12.7	12.4	12.2
4.6	6.3	16.9	15.3	14.8	14.3	13.9	13.5	13.2	12.9	12.7
4.7	6.4	17.5	15.9	15.3	14.9	14.4	14.1	13.7	13.4	13.2
4.8	6.6	18.2	16.5	15.9	15.4	15.0	14.6	14.3	14.0	13.7
4.9	6.7	18.8	17.1	16.5	16.0	15.6	15.2	14.8	14.5	14.2
5.0	6.9	19.5	17.7	17.1	16.6	16.1	15.7	15.3	15.0	14.7
5.1	7.0	20.2	18.4	17.7	17.2	16.7	16.3	15.9	15.6	15.3
5.2	7.1	20.9	19.0	18.3	17.8	17.3	16.9	16.5	16.1	15.8
5.3	7.3	21.6	19.7	19.0	18.4	17.9	17.4	17.0	16.7	16.4
5.4	7.4	22.3	20.3	19.6	19.0	18.5	18.0	17.6	17.2	16.9
5.5	7.5	23.1	21.0	20.3	19.6	19.1	18.6	18.2	17.8	17.5
5.6	7.7	23.8	21.7	20.9	20.3	19.7	19.2	18.8	18.4	18.1
5.7	7.8	24.6	22.4	21.6	20.9	20.4	19.9	19.4	19.0	18.6
5.8	7.9	25.3	23.1	22.3	21.6	21.0	20.5	20.0	19.6	19.2
5.9	8.1	26.1	23.8	23.0	22.3	21.7	21.1	20.6	20.2	19.8
6.0	8.2	26.9	24.5	23.7	22.9	22.3	21.8	21.3	20.8	20.4
6.1	8.4	27.7	25.2	24.4	23.6	23.0	22.4	21.9	21.5	21.1
6.2	8.5	28.5	25.9	25.1	24.3	23.7	23.1	22.6	22.1	21.7

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
4.1	5.6	10.1	10.0	9.8	9.7	9.5	9.4	9.3	9.2
4.2	5.8	10.6	10.4	10.2	10.1	9.9	9.8	9.7	9.6
4.3	5.9	11.0	10.8	10.7	10.5	10.4	10.2	10.1	10.0
4.4	6.0	11.5	11.3	11.1	11.0	10.8	10.7	10.5	10.4
4.5	6.2	12.0	11.8	11.6	11.4	11.3	11.1	11.0	10.9
4.6	6.3	12.5	12.2	12.0	11.9	11.7	11.6	11.4	11.3
4.7	6.4	12.9	12.7	12.5	12.3	12.2	12.0	11.9	11.7
4.8	6.6	13.4	13.2	13.0	12.8	12.6	12.5	12.3	12.2
4.9	6.7	13.9	13.7	13.5	13.3	13.1	13.0	12.8	12.7
5.0	6.9	14.5	14.2	14.0	13.8	13.6	13.4	13.3	13.1
5.1	7.0	15.0	14.7	14.5	14.3	14.1	13.9	13.8	13.6
5.2	7.1	15.5	15.3	15.0	14.8	14.6	14.4	14.3	14.1
5.3	7.3	16.1	15.8	15.6	15.3	15.1	14.9	14.8	14.6
5.4	7.4	16.6	16.3	16.1	15.9	15.6	15.4	15.3	15.1
5.5	7.5	17.2	16.9	16.6	16.4	16.2	16.0	15.8	15.6
5.6	7.7	17.7	17.4	17.2	16.9	16.7	16.5	16.3	16.1
5.7	7.8	18.3	18.0	17.7	17.5	17.3	17.0	16.8	16.7
5.8	7.9	18.9	18.6	18.3	18.0	17.8	17.6	17.4	17.2
5.9	8.1	19.5	19.2	18.9	18.6	18.4	18.1	17.9	17.7
6.0	8.2	20.1	19.8	19.5	19.2	18.9	18.7	18.5	18.3
6.1	8.4	20.7	20.4	20.0	19.8	19.5	19.3	19.1	18.9
6.2	8.5	21.3	21.0	20.6	20.4	20.1	19.9	19.6	19.4

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

¾" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
1.0	0.7	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1.2	0.9	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1.4	1.0	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
1.6	1.2	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
1.8	1.3	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
2.0	1.5	0.9	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7
2.2	1.6	1.1	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8
2.4	1.8	1.3	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9
2.6	1.9	1.5	1.3	1.3	1.2	1.2	1.1	1.1	1.1	1.1
2.8	2.1	1.7	1.5	1.4	1.4	1.3	1.3	1.3	1.2	1.2
3.0	2.2	1.9	1.7	1.6	1.6	1.5	1.5	1.4	1.4	1.4
3.2	2.4	2.1	1.9	1.8	1.7	1.7	1.6	1.6	1.6	1.5
3.4	2.5	2.3	2.1	2.0	1.9	1.9	1.8	1.8	1.7	1.7
3.6	2.7	2.6	2.3	2.2	2.1	2.1	2.0	2.0	1.9	1.9
3.8	2.8	2.8	2.5	2.4	2.4	2.3	2.2	2.2	2.1	2.1
4.0	3.0	3.1	2.8	2.7	2.6	2.5	2.4	2.4	2.3	2.3
4.2	3.1	3.4	3.0	2.9	2.8	2.7	2.7	2.6	2.5	2.5
4.4	3.3	3.6	3.3	3.2	3.1	3.0	2.9	2.8	2.7	2.7
4.6	3.4	3.9	3.5	3.4	3.3	3.2	3.1	3.0	3.0	2.9
4.8	3.6	4.2	3.8	3.7	3.6	3.5	3.4	3.3	3.2	3.1
5.0	3.7	4.5	4.1	4.0	3.8	3.7	3.6	3.5	3.4	3.4
5.2	3.9	4.9	4.4	4.2	4.1	4.0	3.9	3.8	3.7	3.6
5.4	4.0	5.2	4.7	4.5	4.4	4.3	4.1	4.0	4.0	3.9
5.6	4.2	5.5	5.0	4.8	4.7	4.5	4.4	4.3	4.2	4.1
5.8	4.3	5.9	5.3	5.1	5.0	4.8	4.7	4.6	4.5	4.4
6.0	4.5	6.2	5.7	5.5	5.3	5.1	5.0	4.9	4.8	4.7
6.2	4.6	6.6	6.0	5.8	5.6	5.4	5.3	5.2	5.1	5.0
6.4	4.7	7.0	6.3	6.1	5.9	5.8	5.6	5.5	5.4	5.2
6.6	4.9	7.4	6.7	6.5	6.3	6.1	5.9	5.8	5.7	5.5
6.8	5.0	7.8	7.1	6.8	6.6	6.4	6.2	6.1	6.0	5.8

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

¾" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
1.0	0.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1.2	0.9	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
1.4	1.0	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1.6	1.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
1.8	1.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2.0	1.5	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6
2.2	1.6	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
2.4	1.8	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
2.6	1.9	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9
2.8	2.1	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1
3.0	2.2	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2
3.2	2.4	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.3
3.4	2.5	1.7	1.6	1.6	1.6	1.6	1.5	1.5	1.5
3.6	2.7	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.7
3.8	2.8	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8
4.0	3.0	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0
4.2	3.1	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2
4.4	3.3	2.6	2.6	2.5	2.5	2.5	2.4	2.4	2.4
4.6	3.4	2.9	2.8	2.8	2.7	2.7	2.6	2.6	2.6
4.8	3.6	3.1	3.0	3.0	2.9	2.9	2.8	2.8	2.8
5.0	3.7	3.3	3.3	3.2	3.1	3.1	3.1	3.0	3.0
5.2	3.9	3.6	3.5	3.4	3.4	3.3	3.3	3.2	3.2
5.4	4.0	3.8	3.7	3.7	3.6	3.6	3.5	3.5	3.4
5.6	4.2	4.1	4.0	3.9	3.9	3.8	3.8	3.7	3.7
5.8	4.3	4.3	4.2	4.2	4.1	4.0	4.0	3.9	3.9
6.0	4.5	4.6	4.5	4.4	4.4	4.3	4.2	4.2	4.1
6.2	4.6	4.9	4.8	4.7	4.6	4.6	4.5	4.5	4.4
6.4	4.7	5.1	5.1	5.0	4.9	4.8	4.8	4.7	4.7
6.6	4.9	5.4	5.3	5.3	5.2	5.1	5.0	5.0	4.9
6.8	5.0	5.7	5.6	5.5	5.5	5.4	5.3	5.3	5.2

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

¾" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
7.0	5.2	8.2	7.4	7.2	6.9	6.7	6.6	6.4	6.3	6.2
7.2	5.3	8.6	7.8	7.5	7.3	7.1	6.9	6.7	6.6	6.5
7.4	5.5	9.0	8.2	7.9	7.7	7.4	7.3	7.1	6.9	6.8
7.6	5.6	9.4	8.6	8.3	8.0	7.8	7.6	7.4	7.3	7.1
7.8	5.8	9.9	9.0	8.7	8.4	8.2	8.0	7.8	7.6	7.5
8.0	5.9	10.3	9.4	9.1	8.8	8.6	8.3	8.1	8.0	7.8
8.2	6.1	10.8	9.8	9.5	9.2	8.9	8.7	8.5	8.3	8.2
8.4	6.2	11.3	10.2	9.9	9.6	9.3	9.1	8.9	8.7	8.5
8.6	6.4	11.7	10.7	10.3	10.0	9.7	9.5	9.3	9.1	8.9
8.8	6.5	12.2	11.1	10.7	10.4	10.1	9.9	9.7	9.5	9.3
9.0	6.7	12.7	11.6	11.2	10.9	10.6	10.3	10.1	9.9	9.7
9.2	6.8	13.2	12.0	11.6	11.3	11.0	10.7	10.5	10.2	10.1
9.4	7.0	13.7	12.5	12.1	11.7	11.4	11.1	10.9	10.7	10.5
9.6	7.1	14.2	13.0	12.5	12.2	11.8	11.6	11.3	11.1	10.9
9.8	7.3	14.8	13.5	13.0	12.6	12.3	12.0	11.7	11.5	11.3
10.0	7.4	15.3	14.0	13.5	13.1	12.7	12.4	12.2	11.9	11.7
10.2	7.6	15.8	14.5	14.0	13.6	13.2	12.9	12.6	12.3	12.1
10.4	7.7	16.4	15.0	14.5	14.0	13.7	13.3	13.0	12.8	12.5
10.6	7.9	17.0	15.5	15.0	14.5	14.1	13.8	13.5	13.2	13.0
10.8	8.0	17.5	16.0	15.5	15.0	14.6	14.3	14.0	13.7	13.4
11.0	8.2	18.1	16.5	16.0	15.5	15.1	14.7	14.4	14.1	13.9
11.2	8.3	18.7	17.1	16.5	16.0	15.6	15.2	14.9	14.6	14.3
11.4	8.5	19.3	17.6	17.0	16.5	16.1	15.7	15.4	15.1	14.8
11.6	8.6	19.9	18.2	17.6	17.1	16.6	16.2	15.9	15.6	15.3
11.8	8.8	20.5	18.7	18.1	17.6	17.1	16.7	16.4	16.0	15.7

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

¾" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
7.0	5.2	6.0	5.9	5.8	5.8	5.7	5.6	5.5	5.5
7.2	5.3	6.4	6.2	6.2	6.1	6.0	5.9	5.8	5.8
7.4	5.5	6.7	6.6	6.5	6.4	6.3	6.2	6.1	6.1
7.6	5.6	7.0	6.9	6.8	6.7	6.6	6.5	6.4	6.4
7.8	5.8	7.3	7.2	7.1	7.0	6.9	6.8	6.7	6.7
8.0	5.9	7.7	7.6	7.4	7.3	7.2	7.1	7.1	7.0
8.2	6.1	8.0	7.9	7.8	7.7	7.6	7.5	7.4	7.3
8.4	6.2	8.4	8.2	8.1	8.0	7.9	7.8	7.7	7.6
8.6	6.4	8.7	8.6	8.5	8.4	8.2	8.1	8.0	8.0
8.8	6.5	9.1	9.0	8.8	8.7	8.6	8.5	8.4	8.3
9.0	6.7	9.5	9.3	9.2	9.1	8.9	8.8	8.7	8.6
9.2	6.8	9.9	9.7	9.6	9.4	9.3	9.2	9.1	9.0
9.4	7.0	10.3	10.1	9.9	9.8	9.7	9.6	9.5	9.3
9.6	7.1	10.7	10.5	10.3	10.2	10.1	9.9	9.8	9.7
9.8	7.3	11.1	10.9	10.7	10.6	10.4	10.3	10.2	10.1
10.0	7.4	11.5	11.3	11.1	11.0	10.8	10.7	10.6	10.5
10.2	7.6	11.9	11.7	11.5	11.4	11.2	11.1	11.0	10.8
10.4	7.7	12.3	12.1	11.9	11.8	11.6	11.5	11.4	11.2
10.6	7.9	12.8	12.6	12.4	12.2	12.0	11.9	11.8	11.6
10.8	8.0	13.2	13.0	12.8	12.6	12.5	12.3	12.2	12.0
11.0	8.2	13.6	13.4	13.2	13.0	12.9	12.7	12.6	12.5
11.2	8.3	14.1	13.9	13.7	13.5	13.3	13.1	13.0	12.9
11.4	8.5	14.5	14.3	14.1	13.9	13.7	13.6	13.4	13.3
11.6	8.6	15.0	14.8	14.6	14.4	14.2	14.0	13.9	13.7
11.8	8.8	15.5	15.2	15.0	14.8	14.6	14.5	14.3	14.2

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
2.0	0.9	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2.5	1.1	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
3.0	1.3	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4
3.5	1.6	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.5
4.0	1.8	0.9	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7
4.5	2.0	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.8
5.0	2.2	1.4	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0
5.5	2.5	1.6	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2
6.0	2.7	1.9	1.7	1.6	1.6	1.5	1.5	1.4	1.4	1.4
6.5	2.9	2.1	1.9	1.9	1.8	1.8	1.7	1.7	1.6	1.6
7.0	3.1	2.4	2.2	2.1	2.1	2.0	1.9	1.9	1.9	1.8
7.5	3.3	2.8	2.5	2.4	2.3	2.3	2.2	2.1	2.1	2.1
8.0	3.6	3.1	2.8	2.7	2.6	2.5	2.5	2.4	2.4	2.3
8.5	3.8	3.4	3.1	3.0	2.9	2.8	2.7	2.7	2.6	2.6
9.0	4.0	3.8	3.4	3.3	3.2	3.1	3.0	3.0	2.9	2.8
9.5	4.2	4.2	3.8	3.6	3.5	3.4	3.3	3.3	3.2	3.1
10.0	4.5	4.6	4.1	4.0	3.9	3.8	3.7	3.6	3.5	3.4
10.5	4.7	5.0	4.5	4.4	4.2	4.1	4.0	3.9	3.8	3.7
11.0	4.9	5.4	4.9	4.7	4.6	4.5	4.3	4.2	4.2	4.1
11.5	5.1	5.8	5.3	5.1	5.0	4.8	4.7	4.6	4.5	4.4
12.0	5.4	6.3	5.7	5.5	5.4	5.2	5.1	5.0	4.9	4.8

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
2.0	0.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2.5	1.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
3.0	1.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
3.5	1.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
4.0	1.8	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6
4.5	2.0	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7
5.0	2.2	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9
5.5	2.5	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.0
6.0	2.7	1.4	1.3	1.3	1.3	1.3	1.2	1.2	1.2
6.5	2.9	1.6	1.5	1.5	1.5	1.5	1.4	1.4	1.4
7.0	3.1	1.8	1.7	1.7	1.7	1.7	1.6	1.6	1.6
7.5	3.3	2.0	2.0	1.9	1.9	1.9	1.9	1.8	1.8
8.0	3.6	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.0
8.5	3.8	2.5	2.5	2.4	2.4	2.4	2.3	2.3	2.3
9.0	4.0	2.8	2.7	2.7	2.7	2.6	2.6	2.6	2.5
9.5	4.2	3.1	3.0	3.0	2.9	2.9	2.9	2.8	2.8
10.0	4.5	3.4	3.3	3.3	3.2	3.2	3.1	3.1	3.1
10.5	4.7	3.7	3.6	3.6	3.5	3.5	3.4	3.4	3.3
11.0	4.9	4.0	3.9	3.9	3.8	3.8	3.7	3.7	3.6
11.5	5.1	4.3	4.3	4.2	4.1	4.1	4.0	4.0	3.9
12.0	5.4	4.7	4.6	4.5	4.5	4.4	4.3	4.3	4.2

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
12.5	5.6	6.7	6.1	5.9	5.8	5.6	5.5	5.3	5.2	5.1
13.0	5.8	7.2	6.6	6.4	6.2	6.0	5.9	5.7	5.6	5.5
13.5	6.0	7.7	7.0	6.8	6.6	6.4	6.3	6.1	6.0	5.9
14.0	6.2	8.2	7.5	7.3	7.0	6.9	6.7	6.5	6.4	6.3
14.5	6.5	8.8	8.0	7.7	7.5	7.3	7.1	7.0	6.8	6.7
15.0	6.7	9.3	8.5	8.2	8.0	7.8	7.6	7.4	7.2	7.1
15.5	6.9	9.8	9.0	8.7	8.4	8.2	8.0	7.8	7.7	7.5
16.0	7.1	10.4	9.5	9.2	8.9	8.7	8.5	8.3	8.1	8.0
16.5	7.4	11.0	10.1	9.7	9.4	9.2	9.0	8.8	8.6	8.4
17.0	7.6	11.6	10.6	10.3	10.0	9.7	9.5	9.3	9.1	8.9
17.5	7.8	12.2	11.2	10.8	10.5	10.2	10.0	9.8	9.6	9.4
18.0	8.0	12.8	11.7	11.4	11.0	10.8	10.5	10.3	10.1	9.9
18.5	8.3	13.5	12.3	11.9	11.6	11.3	11.0	10.8	10.6	10.4
19.0	8.5	14.1	12.9	12.5	12.2	11.8	11.6	11.3	11.1	10.9
19.5	8.7	14.8	13.5	13.1	12.7	12.4	12.1	11.9	11.6	11.4
20.0	8.9	15.5	14.2	13.7	13.3	13.0	12.7	12.4	12.2	12.0
20.5	9.1	16.2	14.8	14.3	13.9	13.6	13.3	13.0	12.7	12.5
21.0	9.4	16.9	15.5	15.0	14.6	14.2	13.9	13.6	13.3	13.1
21.5	9.6	17.6	16.1	15.6	15.2	14.8	14.5	14.2	13.9	13.6
22.0	9.8	18.3	16.8	16.3	15.8	15.4	15.1	14.8	14.5	14.2
22.5	10.0	19.1	17.5	16.9	16.5	16.1	15.7	15.4	15.1	14.8

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
12.5	5.6	5.0	5.0	4.9	4.8	4.7	4.7	4.6	4.6
13.0	5.8	5.4	5.3	5.2	5.2	5.1	5.0	5.0	4.9
13.5	6.0	5.8	5.7	5.6	5.5	5.4	5.4	5.3	5.3
14.0	6.2	6.2	6.1	6.0	5.9	5.8	5.7	5.7	5.6
14.5	6.5	6.6	6.5	6.4	6.3	6.2	6.1	6.1	6.0
15.0	6.7	7.0	6.9	6.8	6.7	6.6	6.5	6.4	6.4
15.5	6.9	7.4	7.3	7.2	7.1	7.0	6.9	6.8	6.8
16.0	7.1	7.9	7.7	7.6	7.5	7.4	7.3	7.2	7.2
16.5	7.4	8.3	8.2	8.1	7.9	7.8	7.8	7.7	7.6
17.0	7.6	8.8	8.6	8.5	8.4	8.3	8.2	8.1	8.0
17.5	7.8	9.2	9.1	9.0	8.8	8.7	8.6	8.5	8.4
18.0	8.0	9.7	9.6	9.4	9.3	9.2	9.1	9.0	8.9
18.5	8.3	10.2	10.1	9.9	9.8	9.7	9.5	9.4	9.3
19.0	8.5	10.7	10.6	10.4	10.3	10.1	10.0	9.9	9.8
19.5	8.7	11.2	11.1	10.9	10.8	10.6	10.5	10.4	10.3
20.0	8.9	11.8	11.6	11.4	11.3	11.1	11.0	10.9	10.8
20.5	9.1	12.3	12.1	11.9	11.8	11.6	11.5	11.4	11.3
21.0	9.4	12.9	12.7	12.5	12.3	12.2	12.0	11.9	11.8
21.5	9.6	13.4	13.2	13.0	12.9	12.7	12.6	12.4	12.3
22.0	9.8	14.0	13.8	13.6	13.4	13.3	13.1	13.0	12.8
22.5	10.0	14.6	14.4	14.2	14.0	13.8	13.7	13.5	13.4

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1¼" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
3.0	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
3.5	0.9	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
4.0	1.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
4.5	1.1	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
5.0	1.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
5.5	1.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
6.0	1.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3
6.5	1.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
7.0	1.8	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
7.5	1.9	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5
8.0	2.0	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
8.5	2.1	0.9	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.6
9.0	2.3	1.0	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7
9.5	2.4	1.1	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.8
10.0	2.5	1.2	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
10.5	2.6	1.3	1.1	1.1	1.1	1.0	1.0	1.0	1.0	0.9
11.0	2.8	1.4	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1.0
11.5	2.9	1.5	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1
12.0	3.0	1.6	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2
12.5	3.1	1.7	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3
13.0	3.3	1.8	1.7	1.6	1.5	1.5	1.5	1.4	1.4	1.4
13.5	3.4	1.9	1.8	1.7	1.7	1.6	1.6	1.5	1.5	1.5
14.0	3.5	2.1	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.6
14.5	3.6	2.2	2.0	1.9	1.9	1.8	1.8	1.7	1.7	1.7
15.0	3.8	2.3	2.1	2.1	2.0	1.9	1.9	1.8	1.8	1.8
15.5	3.9	2.5	2.3	2.2	2.1	2.1	2.0	2.0	1.9	1.9
16.0	4.0	2.6	2.4	2.3	2.2	2.2	2.1	2.1	2.0	2.0
16.5	4.1	2.8	2.5	2.4	2.4	2.3	2.2	2.2	2.1	2.1
17.0	4.3	2.9	2.7	2.6	2.5	2.4	2.4	2.3	2.3	2.2
17.5	4.4	3.1	2.8	2.7	2.6	2.5	2.5	2.4	2.4	2.3
18.0	4.5	3.2	2.9	2.8	2.8	2.7	2.6	2.6	2.5	2.5
18.5	4.6	3.4	3.1	3.0	2.9	2.8	2.7	2.7	2.6	2.6

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1¼" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
3.0	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
3.5	0.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
4.0	1.0	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1
4.5	1.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
5.0	1.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
5.5	1.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
6.0	1.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
6.5	1.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
7.0	1.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
7.5	1.9	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
8.0	2.0	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
8.5	2.1	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
9.0	2.3	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6
9.5	2.4	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
10.0	2.5	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
10.5	2.6	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8
11.0	2.8	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
11.5	2.9	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0
12.0	3.0	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1
12.5	3.1	1.3	1.2	1.2	1.2	1.2	1.2	1.1	1.1
13.0	3.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2
13.5	3.4	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3
14.0	3.5	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4
14.5	3.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5
15.0	3.8	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6
15.5	3.9	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.7
16.0	4.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8
16.5	4.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9
17.0	4.3	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0
17.5	4.4	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1
18.0	4.5	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2
18.5	4.6	2.5	2.5	2.5	2.4	2.4	2.4	2.3	2.3

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1¼" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
19.0	4.8	3.5	3.2	3.1	3.0	3.0	2.9	2.8	2.8	2.7
19.5	4.9	3.7	3.4	3.3	3.2	3.1	3.0	2.9	2.9	2.8
20.0	5.0	3.9	3.5	3.4	3.3	3.2	3.2	3.1	3.0	3.0
20.5	5.1	4.1	3.7	3.6	3.5	3.4	3.3	3.2	3.2	3.1
21.0	5.3	4.2	3.9	3.7	3.6	3.5	3.4	3.4	3.3	3.2
21.5	5.4	4.4	4.0	3.9	3.8	3.7	3.6	3.5	3.4	3.4
22.0	5.5	4.6	4.2	4.1	3.9	3.8	3.7	3.7	3.6	3.5
22.5	5.6	4.8	4.4	4.2	4.1	4.0	3.9	3.8	3.7	3.7
23.0	5.8	5.0	4.5	4.4	4.3	4.2	4.1	4.0	3.9	3.8
23.5	5.9	5.2	4.7	4.6	4.4	4.3	4.2	4.1	4.0	4.0
24.0	6.0	5.4	4.9	4.7	4.6	4.5	4.4	4.3	4.2	4.1
24.5	6.1	5.6	5.1	4.9	4.8	4.7	4.5	4.4	4.4	4.3
25.0	6.3	5.8	5.3	5.1	5.0	4.8	4.7	4.6	4.5	4.4
25.5	6.4	6.0	5.5	5.3	5.1	5.0	4.9	4.8	4.7	4.6
26.0	6.5	6.2	5.7	5.5	5.3	5.2	5.1	4.9	4.8	4.8
26.5	6.6	6.4	5.8	5.7	5.5	5.4	5.2	5.1	5.0	4.9
27.0	6.8	6.6	6.0	5.9	5.7	5.5	5.4	5.3	5.2	5.1
27.5	6.9	6.8	6.2	6.0	5.9	5.7	5.6	5.5	5.4	5.3
28.0	7.0	7.0	6.5	6.2	6.1	5.9	5.8	5.7	5.5	5.4
28.5	7.1	7.3	6.7	6.4	6.3	6.1	6.0	5.8	5.7	5.6
29.0	7.3	7.5	6.9	6.7	6.5	6.3	6.2	6.0	5.9	5.8
29.5	7.4	7.7	7.1	6.9	6.7	6.5	6.3	6.2	6.1	6.0
30.0	7.5	8.0	7.3	7.1	6.9	6.7	6.5	6.4	6.3	6.2
30.5	7.6	8.2	7.5	7.3	7.1	6.9	6.7	6.6	6.5	6.4
31.0	7.8	8.4	7.7	7.5	7.3	7.1	6.9	6.8	6.7	6.5
31.5	7.9	8.7	8.0	7.7	7.5	7.3	7.1	7.0	6.9	6.7
32.0	8.0	8.9	8.2	7.9	7.7	7.5	7.3	7.2	7.1	6.9
32.5	8.1	9.2	8.4	8.2	7.9	7.7	7.6	7.4	7.3	7.1

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1¼" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
19.0	4.8	2.7	2.6	2.6	2.5	2.5	2.5	2.4	2.4
19.5	4.9	2.8	2.7	2.7	2.7	2.6	2.6	2.6	2.5
20.0	5.0	2.9	2.9	2.8	2.8	2.7	2.7	2.7	2.7
20.5	5.1	3.0	3.0	3.0	2.9	2.9	2.8	2.8	2.8
21.0	5.3	3.2	3.1	3.1	3.0	3.0	3.0	2.9	2.9
21.5	5.4	3.3	3.3	3.2	3.2	3.1	3.1	3.1	3.0
22.0	5.5	3.5	3.4	3.4	3.3	3.3	3.2	3.2	3.2
22.5	5.6	3.6	3.5	3.5	3.4	3.4	3.4	3.3	3.3
23.0	5.8	3.7	3.7	3.6	3.6	3.5	3.5	3.5	3.4
23.5	5.9	3.9	3.8	3.8	3.7	3.7	3.6	3.6	3.6
24.0	6.0	4.0	4.0	3.9	3.9	3.8	3.8	3.7	3.7
24.5	6.1	4.2	4.1	4.1	4.0	4.0	3.9	3.9	3.8
25.0	6.3	4.4	4.3	4.2	4.2	4.1	4.1	4.0	4.0
25.5	6.4	4.5	4.4	4.4	4.3	4.3	4.2	4.2	4.1
26.0	6.5	4.7	4.6	4.5	4.5	4.4	4.4	4.3	4.3
26.5	6.6	4.8	4.8	4.7	4.6	4.6	4.5	4.5	4.4
27.0	6.8	5.0	4.9	4.9	4.8	4.7	4.7	4.6	4.6
27.5	6.9	5.2	5.1	5.0	5.0	4.9	4.8	4.8	4.7
28.0	7.0	5.4	5.3	5.2	5.1	5.1	5.0	4.9	4.9
28.5	7.1	5.5	5.4	5.4	5.3	5.2	5.2	5.1	5.1
29.0	7.3	5.7	5.6	5.5	5.5	5.4	5.3	5.3	5.2
29.5	7.4	5.9	5.8	5.7	5.6	5.6	5.5	5.4	5.4
30.0	7.5	6.1	6.0	5.9	5.8	5.7	5.7	5.6	5.6
30.5	7.6	6.2	6.2	6.1	6.0	5.9	5.8	5.8	5.7
31.0	7.8	6.4	6.3	6.2	6.2	6.1	6.0	6.0	5.9
31.5	7.9	6.6	6.5	6.4	6.3	6.3	6.2	6.1	6.1
32.0	8.0	6.8	6.7	6.6	6.5	6.5	6.4	6.3	6.2
32.5	8.1	7.0	6.9	6.8	6.7	6.6	6.6	6.5	6.4

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
5.0	0.9	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
6.0	1.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
7.0	1.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
8.0	1.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
9.0	1.6	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
10.0	1.8	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
11.0	2.0	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
12.0	2.2	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6
13.0	2.4	0.9	0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.6
14.0	2.5	1.0	0.9	0.8	0.8	0.8	0.8	0.8	0.7	0.7
15.0	2.7	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.8
16.0	2.9	1.2	1.1	1.1	1.0	1.0	1.0	1.0	0.9	0.9
17.0	3.1	1.4	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1.0
18.0	3.3	1.5	1.4	1.3	1.3	1.2	1.2	1.2	1.2	1.1
19.0	3.4	1.7	1.5	1.5	1.4	1.4	1.3	1.3	1.3	1.3
20.0	3.6	1.8	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4
21.0	3.8	2.0	1.8	1.7	1.7	1.6	1.6	1.6	1.5	1.5
22.0	4.0	2.1	2.0	1.9	1.8	1.8	1.7	1.7	1.7	1.6
23.0	4.2	2.3	2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.8
24.0	4.4	2.5	2.3	2.2	2.1	2.1	2.0	2.0	1.9	1.9

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
5.0	0.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
6.0	1.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
7.0	1.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
8.0	1.5	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
9.0	1.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
10.0	1.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
11.0	2.0	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4
12.0	2.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
13.0	2.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
14.0	2.5	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6
15.0	2.7	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7
16.0	2.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
17.0	3.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9
18.0	3.3	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0
19.0	3.4	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1
20.0	3.6	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2
21.0	3.8	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.3
22.0	4.0	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.5
23.0	4.2	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6
24.0	4.4	1.9	1.8	1.8	1.8	1.8	1.7	1.7	1.7

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
25.0	4.5	2.7	2.4	2.4	2.3	2.2	2.2	2.1	2.1	2.0
26.0	4.7	2.9	2.6	2.5	2.5	2.4	2.3	2.3	2.2	2.2
27.0	4.9	3.1	2.8	2.7	2.6	2.6	2.5	2.4	2.4	2.4
28.0	5.1	3.3	3.0	2.9	2.8	2.7	2.7	2.6	2.6	2.5
29.0	5.3	3.5	3.2	3.1	3.0	2.9	2.8	2.8	2.7	2.7
30.0	5.4	3.7	3.4	3.3	3.2	3.1	3.0	3.0	2.9	2.8
31.0	5.6	3.9	3.6	3.5	3.4	3.3	3.2	3.1	3.1	3.0
32.0	5.8	4.2	3.8	3.7	3.6	3.5	3.4	3.3	3.3	3.2
33.0	6.0	4.4	4.0	3.9	3.8	3.7	3.6	3.5	3.4	3.4
34.0	6.2	4.6	4.2	4.1	4.0	3.9	3.8	3.7	3.6	3.6
35.0	6.4	4.9	4.5	4.3	4.2	4.1	4.0	3.9	3.8	3.8
36.0	6.5	5.1	4.7	4.5	4.4	4.3	4.2	4.1	4.0	4.0
37.0	6.7	5.4	4.9	4.8	4.6	4.5	4.4	4.3	4.2	4.2
38.0	6.9	5.6	5.2	5.0	4.9	4.7	4.6	4.5	4.4	4.4
39.0	7.1	5.9	5.4	5.2	5.1	5.0	4.9	4.8	4.7	4.6
40.0	7.3	6.2	5.7	5.5	5.3	5.2	5.1	5.0	4.9	4.8
41.0	7.4	6.4	5.9	5.7	5.6	5.4	5.3	5.2	5.1	5.0
42.0	7.6	6.7	6.2	6.0	5.8	5.7	5.5	5.4	5.3	5.2
43.0	7.8	7.0	6.4	6.2	6.1	5.9	5.8	5.7	5.6	5.5
44.0	8.0	7.3	6.7	6.5	6.3	6.2	6.0	5.9	5.8	5.7
45.0	8.2	7.6	7.0	6.8	6.6	6.4	6.3	6.2	6.0	5.9
46.0	8.4	7.9	7.3	7.1	6.9	6.7	6.5	6.4	6.3	6.2
47.0	8.5	8.2	7.6	7.3	7.1	7.0	6.8	6.7	6.5	6.4
48.0	8.7	8.5	7.9	7.6	7.4	7.2	7.1	6.9	6.8	6.7
49.0	8.9	8.9	8.1	7.9	7.7	7.5	7.3	7.2	7.0	6.9
50.0	9.1	9.2	8.4	8.2	8.0	7.8	7.6	7.4	7.3	7.2
51.0	9.3	9.5	8.8	8.5	8.3	8.1	7.9	7.7	7.6	7.4
52.0	9.4	9.8	9.1	8.8	8.6	8.3	8.2	8.0	7.8	7.7
53.0	9.6	10.2	9.4	9.1	8.9	8.6	8.4	8.3	8.1	8.0
54.0	9.8	10.5	9.7	9.4	9.2	8.9	8.7	8.6	8.4	8.3
55.0	10.0	10.9	10.0	9.7	9.5	9.2	9.0	8.9	8.7	8.5

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
25.0	4.5	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.8
26.0	4.7	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0
27.0	4.9	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1
28.0	5.1	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.3
29.0	5.3	2.6	2.6	2.6	2.5	2.5	2.5	2.4	2.4
30.0	5.4	2.8	2.8	2.7	2.7	2.6	2.6	2.6	2.6
31.0	5.6	3.0	2.9	2.9	2.8	2.8	2.8	2.7	2.7
32.0	5.8	3.1	3.1	3.1	3.0	3.0	2.9	2.9	2.9
33.0	6.0	3.3	3.3	3.2	3.2	3.1	3.1	3.1	3.0
34.0	6.2	3.5	3.5	3.4	3.4	3.3	3.3	3.2	3.2
35.0	6.4	3.7	3.6	3.6	3.5	3.5	3.5	3.4	3.4
36.0	6.5	3.9	3.8	3.8	3.7	3.7	3.6	3.6	3.6
37.0	6.7	4.1	4.0	4.0	3.9	3.9	3.8	3.8	3.7
38.0	6.9	4.3	4.2	4.2	4.1	4.1	4.0	4.0	3.9
39.0	7.1	4.5	4.4	4.4	4.3	4.3	4.2	4.2	4.1
40.0	7.3	4.7	4.6	4.6	4.5	4.5	4.4	4.4	4.3
41.0	7.4	4.9	4.9	4.8	4.7	4.7	4.6	4.6	4.5
42.0	7.6	5.1	5.1	5.0	4.9	4.9	4.8	4.8	4.7
43.0	7.8	5.4	5.3	5.2	5.2	5.1	5.0	5.0	4.9
44.0	8.0	5.6	5.5	5.4	5.4	5.3	5.2	5.2	5.1
45.0	8.2	5.8	5.7	5.7	5.6	5.5	5.5	5.4	5.4
46.0	8.4	6.1	6.0	5.9	5.8	5.8	5.7	5.6	5.6
47.0	8.5	6.3	6.2	6.1	6.1	6.0	5.9	5.9	5.8
48.0	8.7	6.6	6.5	6.4	6.3	6.2	6.2	6.1	6.0
49.0	8.9	6.8	6.7	6.6	6.5	6.5	6.4	6.3	6.3
50.0	9.1	7.1	7.0	6.9	6.8	6.7	6.6	6.6	6.5
51.0	9.3	7.3	7.2	7.1	7.0	7.0	6.9	6.8	6.7
52.0	9.4	7.6	7.5	7.4	7.3	7.2	7.1	7.1	7.0
53.0	9.6	7.9	7.7	7.6	7.5	7.5	7.4	7.3	7.2
54.0	9.8	8.1	8.0	7.9	7.8	7.7	7.6	7.6	7.5
55.0	10.0	8.4	8.3	8.2	8.1	8.0	7.9	7.8	7.7

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

2" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
8.0	0.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
9.5	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
11.0	1.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
12.5	1.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
14.0	1.5	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
15.5	1.7	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
17.0	1.8	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
18.5	2.0	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3
20.0	2.2	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
21.5	2.3	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
23.0	2.5	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5
24.5	2.7	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
26.0	2.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.6
27.5	3.0	0.9	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7
29.0	3.2	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
30.5	3.3	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
32.0	3.5	1.2	1.1	1.1	1.0	1.0	1.0	1.0	0.9	0.9
33.5	3.6	1.3	1.2	1.2	1.1	1.1	1.1	1.1	1.0	1.0
35.0	3.8	1.4	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1
36.5	4.0	1.5	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2
38.0	4.1	1.7	1.5	1.5	1.4	1.4	1.3	1.3	1.3	1.3
39.5	4.3	1.8	1.6	1.6	1.5	1.5	1.4	1.4	1.4	1.4
41.0	4.5	1.9	1.7	1.7	1.6	1.6	1.5	1.5	1.5	1.5
42.5	4.6	2.0	1.8	1.8	1.7	1.7	1.6	1.6	1.6	1.5
44.0	4.8	2.1	2.0	1.9	1.8	1.8	1.8	1.7	1.7	1.6
45.5	4.9	2.3	2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.8
47.0	5.1	2.4	2.2	2.1	2.1	2.0	2.0	1.9	1.9	1.9
48.5	5.3	2.5	2.3	2.3	2.2	2.1	2.1	2.0	2.0	2.0
50.0	5.4	2.7	2.5	2.4	2.3	2.3	2.2	2.2	2.1	2.1
51.5	5.6	2.8	2.6	2.5	2.4	2.4	2.3	2.3	2.2	2.2
53.0	5.8	3.0	2.7	2.6	2.6	2.5	2.5	2.4	2.4	2.3
54.5	5.9	3.1	2.9	2.8	2.7	2.6	2.6	2.5	2.5	2.4

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

2" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
8.0	0.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
9.5	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
11.0	1.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
12.5	1.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
14.0	1.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
15.5	1.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
17.0	1.8	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
18.5	2.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
20.0	2.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
21.5	2.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
23.0	2.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
24.5	2.7	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
26.0	2.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
27.5	3.0	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6
29.0	3.2	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
30.5	3.3	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
32.0	3.5	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8
33.5	3.6	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
35.0	3.8	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0
36.5	4.0	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1
38.0	4.1	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1
39.5	4.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2
41.0	4.5	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3
42.5	4.6	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4
44.0	4.8	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5
45.5	4.9	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6
47.0	5.1	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.7
48.5	5.3	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8
50.0	5.4	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9
51.5	5.6	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0
53.0	5.8	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1
54.5	5.9	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

2" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
56.0	6.1	3.3	3.0	2.9	2.8	2.8	2.7	2.6	2.6	2.6
57.5	6.2	3.4	3.2	3.1	3.0	2.9	2.8	2.8	2.7	2.7
59.0	6.4	3.6	3.3	3.2	3.1	3.0	3.0	2.9	2.9	2.8
60.5	6.6	3.8	3.5	3.4	3.3	3.2	3.1	3.0	3.0	2.9
62.0	6.7	3.9	3.6	3.5	3.4	3.3	3.3	3.2	3.1	3.1
63.5	6.9	4.1	3.8	3.7	3.6	3.5	3.4	3.3	3.3	3.2
65.0	7.1	4.3	3.9	3.8	3.7	3.6	3.5	3.5	3.4	3.3
66.5	7.2	4.5	4.1	4.0	3.9	3.8	3.7	3.6	3.5	3.5
68.0	7.4	4.6	4.3	4.1	4.0	3.9	3.8	3.8	3.7	3.6
69.5	7.6	4.8	4.4	4.3	4.2	4.1	4.0	3.9	3.8	3.8
71.0	7.7	5.0	4.6	4.5	4.4	4.3	4.2	4.1	4.0	3.9
72.5	7.9	5.2	4.8	4.7	4.5	4.4	4.3	4.2	4.2	4.1
74.0	8.0	5.4	5.0	4.8	4.7	4.6	4.5	4.4	4.3	4.2
75.5	8.2	5.6	5.2	5.0	4.9	4.8	4.6	4.6	4.5	4.4
77.0	8.4	5.8	5.3	5.2	5.0	4.9	4.8	4.7	4.6	4.6
78.5	8.5	6.0	5.5	5.4	5.2	5.1	5.0	4.9	4.8	4.7
80.0	8.7	6.2	5.7	5.6	5.4	5.3	5.2	5.1	5.0	4.9
81.5	8.9	6.4	5.9	5.7	5.6	5.5	5.3	5.2	5.1	5.0
83.0	9.0	6.6	6.1	5.9	5.8	5.6	5.5	5.4	5.3	5.2
84.5	9.2	6.9	6.3	6.1	6.0	5.8	5.7	5.6	5.5	5.4
86.0	9.3	7.1	6.5	6.3	6.2	6.0	5.9	5.8	5.7	5.6
87.5	9.5	7.3	6.7	6.5	6.4	6.2	6.1	6.0	5.8	5.7
89.0	9.7	7.5	6.9	6.7	6.6	6.4	6.3	6.1	6.0	5.9
90.5	9.8	7.7	7.1	6.9	6.8	6.6	6.5	6.3	6.2	6.1
92.0	10.0	8.0	7.4	7.1	7.0	6.8	6.6	6.5	6.4	6.3

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

2" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
56.0	6.1	2.5	2.5	2.4	2.4	2.4	2.3	2.3	2.3
57.5	6.2	2.6	2.6	2.6	2.5	2.5	2.5	2.4	2.4
59.0	6.4	2.8	2.7	2.7	2.6	2.6	2.6	2.6	2.5
60.5	6.6	2.9	2.8	2.8	2.8	2.7	2.7	2.7	2.6
62.0	6.7	3.0	3.0	2.9	2.9	2.9	2.8	2.8	2.8
63.5	6.9	3.2	3.1	3.1	3.0	3.0	3.0	2.9	2.9
65.0	7.1	3.3	3.2	3.2	3.2	3.1	3.1	3.0	3.0
66.5	7.2	3.4	3.4	3.3	3.3	3.2	3.2	3.2	3.1
68.0	7.4	3.6	3.5	3.5	3.4	3.4	3.3	3.3	3.3
69.5	7.6	3.7	3.7	3.6	3.6	3.5	3.5	3.4	3.4
71.0	7.7	3.9	3.8	3.8	3.7	3.7	3.6	3.6	3.5
72.5	7.9	4.0	4.0	3.9	3.9	3.8	3.8	3.7	3.7
74.0	8.0	4.2	4.1	4.0	4.0	4.0	3.9	3.9	3.8
75.5	8.2	4.3	4.3	4.2	4.1	4.1	4.1	4.0	4.0
77.0	8.4	4.5	4.4	4.4	4.3	4.2	4.2	4.2	4.1
78.5	8.5	4.6	4.6	4.5	4.5	4.4	4.4	4.3	4.3
80.0	8.7	4.8	4.7	4.7	4.6	4.6	4.5	4.5	4.4
81.5	8.9	5.0	4.9	4.8	4.8	4.7	4.7	4.6	4.6
83.0	9.0	5.1	5.1	5.0	4.9	4.9	4.8	4.8	4.7
84.5	9.2	5.3	5.2	5.2	5.1	5.0	5.0	4.9	4.9
86.0	9.3	5.5	5.4	5.3	5.3	5.2	5.1	5.1	5.0
87.5	9.5	5.7	5.6	5.5	5.4	5.4	5.3	5.3	5.2
89.0	9.7	5.8	5.8	5.7	5.6	5.5	5.5	5.4	5.4
90.5	9.8	6.0	5.9	5.9	5.8	5.7	5.7	5.6	5.5
92.0	10.0	6.2	6.1	6.0	6.0	5.9	5.8	5.8	5.7

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

2½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
10.0	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
12.0	0.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
14.0	1.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
16.0	1.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
18.0	1.4	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
20.0	1.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
22.0	1.7	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
24.0	1.8	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
26.0	2.0	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
28.0	2.1	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
30.0	2.3	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3
32.0	2.4	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4
34.0	2.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4
36.0	2.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
38.0	2.9	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5
40.0	3.0	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
42.0	3.2	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.6
44.0	3.3	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
46.0	3.5	1.0	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.7
48.0	3.6	1.1	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8
50.0	3.8	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
52.0	3.9	1.2	1.1	1.1	1.0	1.0	1.0	1.0	1.0	0.9
54.0	4.1	1.3	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0
56.0	4.2	1.4	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1
58.0	4.4	1.5	1.4	1.3	1.3	1.2	1.2	1.2	1.2	1.1
60.0	4.5	1.6	1.4	1.4	1.4	1.3	1.3	1.3	1.2	1.2
62.0	4.7	1.7	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3
64.0	4.8	1.8	1.6	1.6	1.5	1.5	1.4	1.4	1.4	1.4
66.0	5.0	1.9	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.4
68.0	5.1	2.0	1.8	1.7	1.7	1.6	1.6	1.6	1.5	1.5
70.0	5.3	2.1	1.9	1.8	1.8	1.7	1.7	1.7	1.6	1.6
72.0	5.5	2.2	2.0	1.9	1.9	1.8	1.8	1.7	1.7	1.7

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

2½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
10.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.0	0.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
14.0	1.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
16.0	1.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
18.0	1.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
20.0	1.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
22.0	1.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
24.0	1.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
26.0	2.0	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
28.0	2.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
30.0	2.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
32.0	2.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3
34.0	2.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
36.0	2.7	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4
38.0	2.9	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
40.0	3.0	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
42.0	3.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
44.0	3.3	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
46.0	3.5	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
48.0	3.6	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
50.0	3.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8
52.0	3.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8
54.0	4.1	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
56.0	4.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
58.0	4.4	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0
60.0	4.5	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1
62.0	4.7	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2
64.0	4.8	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2
66.0	5.0	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3
68.0	5.1	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4
70.0	5.3	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.4
72.0	5.5	1.7	1.6	1.6	1.6	1.6	1.5	1.5	1.5

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

2½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
74.0	5.6	2.3	2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.8
76.0	5.8	2.4	2.2	2.1	2.1	2.0	2.0	1.9	1.9	1.9
78.0	5.9	2.5	2.3	2.2	2.2	2.1	2.1	2.0	2.0	1.9
80.0	6.1	2.6	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.0
82.0	6.2	2.7	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.1
84.0	6.4	2.9	2.6	2.5	2.5	2.4	2.4	2.3	2.3	2.2
86.0	6.5	3.0	2.7	2.7	2.6	2.5	2.5	2.4	2.4	2.3
88.0	6.7	3.1	2.9	2.8	2.7	2.6	2.6	2.5	2.5	2.4
90.0	6.8	3.2	3.0	2.9	2.8	2.7	2.7	2.6	2.6	2.5
92.0	7.0	3.4	3.1	3.0	2.9	2.8	2.8	2.7	2.7	2.6
94.0	7.1	3.5	3.2	3.1	3.0	3.0	2.9	2.8	2.8	2.7
96.0	7.3	3.6	3.3	3.2	3.1	3.1	3.0	2.9	2.9	2.8
98.0	7.4	3.8	3.5	3.4	3.3	3.2	3.1	3.1	3.0	2.9
100.0	7.6	3.9	3.6	3.5	3.4	3.3	3.2	3.2	3.1	3.1
102.0	7.7	4.0	3.7	3.6	3.5	3.4	3.4	3.3	3.2	3.2
104.0	7.9	4.2	3.8	3.7	3.6	3.5	3.5	3.4	3.3	3.3
106.0	8.0	4.3	4.0	3.9	3.8	3.7	3.6	3.5	3.5	3.4
108.0	8.2	4.5	4.1	4.0	3.9	3.8	3.7	3.6	3.6	3.5
110.0	8.3	4.6	4.3	4.1	4.0	3.9	3.8	3.8	3.7	3.6
112.0	8.5	4.8	4.4	4.3	4.2	4.1	4.0	3.9	3.8	3.8
114.0	8.6	4.9	4.5	4.4	4.3	4.2	4.1	4.0	3.9	3.9
116.0	8.8	5.1	4.7	4.5	4.4	4.3	4.2	4.1	4.1	4.0
118.0	8.9	5.2	4.8	4.7	4.6	4.5	4.4	4.3	4.2	4.1
120.0	9.1	5.4	5.0	4.8	4.7	4.6	4.5	4.4	4.3	4.3
122.0	9.2	5.6	5.1	5.0	4.9	4.7	4.6	4.5	4.5	4.4
124.0	9.4	5.7	5.3	5.1	5.0	4.9	4.8	4.7	4.6	4.5
126.0	9.5	5.9	5.4	5.3	5.1	5.0	4.9	4.8	4.7	4.7
128.0	9.7	6.1	5.6	5.4	5.3	5.2	5.1	5.0	4.9	4.8

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

2½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
74.0	5.6	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6
76.0	5.8	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.7
78.0	5.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8
80.0	6.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8
82.0	6.2	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9
84.0	6.4	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0
86.0	6.5	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1
88.0	6.7	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2
90.0	6.8	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.3
92.0	7.0	2.6	2.5	2.5	2.5	2.4	2.4	2.4	2.4
94.0	7.1	2.7	2.6	2.6	2.6	2.5	2.5	2.5	2.5
96.0	7.3	2.8	2.8	2.7	2.7	2.6	2.6	2.6	2.6
98.0	7.4	2.9	2.9	2.8	2.8	2.7	2.7	2.7	2.7
100.0	7.6	3.0	3.0	2.9	2.9	2.9	2.8	2.8	2.8
102.0	7.7	3.1	3.1	3.0	3.0	3.0	2.9	2.9	2.9
104.0	7.9	3.2	3.2	3.1	3.1	3.1	3.0	3.0	3.0
106.0	8.0	3.3	3.3	3.3	3.2	3.2	3.1	3.1	3.1
108.0	8.2	3.5	3.4	3.4	3.3	3.3	3.2	3.2	3.2
110.0	8.3	3.6	3.5	3.5	3.4	3.4	3.4	3.3	3.3
112.0	8.5	3.7	3.6	3.6	3.6	3.5	3.5	3.4	3.4
114.0	8.6	3.8	3.8	3.7	3.7	3.6	3.6	3.6	3.5
116.0	8.8	3.9	3.9	3.8	3.8	3.7	3.7	3.7	3.6
118.0	8.9	4.1	4.0	4.0	3.9	3.9	3.8	3.8	3.7
120.0	9.1	4.2	4.1	4.1	4.0	4.0	3.9	3.9	3.9
122.0	9.2	4.3	4.3	4.2	4.2	4.1	4.1	4.0	4.0
124.0	9.4	4.5	4.4	4.3	4.3	4.2	4.2	4.1	4.1
126.0	9.5	4.6	4.5	4.5	4.4	4.4	4.3	4.3	4.2
128.0	9.7	4.7	4.7	4.6	4.5	4.5	4.4	4.4	4.4

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

3" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
15.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.0	0.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0
21.0	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
24.0	1.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
27.0	1.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
30.0	1.5	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
33.0	1.6	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1
36.0	1.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
39.0	1.9	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
42.0	2.0	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
45.0	2.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2
48.0	2.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
51.0	2.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
54.0	2.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3
57.0	2.8	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
60.0	2.9	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4
63.0	3.1	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
66.0	3.2	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
69.0	3.4	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5
72.0	3.5	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
75.0	3.6	0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6
78.0	3.8	0.9	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
81.0	3.9	0.9	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7
84.0	4.1	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8
87.0	4.2	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8
90.0	4.4	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
93.0	4.5	1.2	1.1	1.1	1.0	1.0	1.0	1.0	0.9	0.9
96.0	4.7	1.3	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0
99.0	4.8	1.3	1.2	1.2	1.1	1.1	1.1	1.1	1.0	1.0
102.0	5.0	1.4	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

3" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
15.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21.0	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
24.0	1.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
27.0	1.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
30.0	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
33.0	1.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
36.0	1.7	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1
39.0	1.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
42.0	2.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
45.0	2.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
48.0	2.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2
51.0	2.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
54.0	2.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
57.0	2.8	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
60.0	2.9	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
63.0	3.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
66.0	3.2	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4
69.0	3.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
72.0	3.5	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
75.0	3.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
78.0	3.8	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6
81.0	3.9	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6
84.0	4.1	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7
87.0	4.2	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7
90.0	4.4	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8
93.0	4.5	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8
96.0	4.7	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9
99.0	4.8	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9
102.0	5.0	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

3" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
105.0	5.1	1.5	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.1
108.0	5.2	1.5	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2
111.0	5.4	1.6	1.5	1.4	1.4	1.4	1.3	1.3	1.3	1.3
114.0	5.5	1.7	1.6	1.5	1.5	1.4	1.4	1.4	1.4	1.3
117.0	5.7	1.8	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4
120.0	5.8	1.9	1.7	1.7	1.6	1.6	1.5	1.5	1.5	1.5
123.0	6.0	1.9	1.8	1.7	1.7	1.6	1.6	1.6	1.6	1.5
126.0	6.1	2.0	1.9	1.8	1.8	1.7	1.7	1.7	1.6	1.6
129.0	6.3	2.1	2.0	1.9	1.8	1.8	1.8	1.7	1.7	1.7
132.0	6.4	2.2	2.0	2.0	1.9	1.9	1.8	1.8	1.8	1.7
135.0	6.6	2.3	2.1	2.1	2.0	2.0	1.9	1.9	1.8	1.8
138.0	6.7	2.4	2.2	2.1	2.1	2.0	2.0	1.9	1.9	1.9
141.0	6.8	2.5	2.3	2.2	2.2	2.1	2.1	2.0	2.0	2.0
144.0	7.0	2.6	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.0
147.0	7.1	2.7	2.5	2.4	2.3	2.3	2.2	2.2	2.1	2.1
150.0	7.3	2.8	2.6	2.5	2.4	2.4	2.3	2.3	2.2	2.2
153.0	7.4	2.9	2.7	2.6	2.5	2.4	2.4	2.3	2.3	2.3
156.0	7.6	3.0	2.7	2.7	2.6	2.5	2.5	2.4	2.4	2.3
159.0	7.7	3.1	2.8	2.8	2.7	2.6	2.6	2.5	2.5	2.4
162.0	7.9	3.2	2.9	2.9	2.8	2.7	2.7	2.6	2.6	2.5
165.0	8.0	3.3	3.0	3.0	2.9	2.8	2.7	2.7	2.6	2.6
168.0	8.2	3.4	3.1	3.1	3.0	2.9	2.8	2.8	2.7	2.7
171.0	8.3	3.5	3.2	3.1	3.1	3.0	2.9	2.9	2.8	2.8
174.0	8.5	3.6	3.3	3.3	3.2	3.1	3.0	3.0	2.9	2.9
177.0	8.6	3.7	3.5	3.4	3.3	3.2	3.1	3.1	3.0	3.0
180.0	8.7	3.9	3.6	3.5	3.4	3.3	3.2	3.2	3.1	3.1
183.0	8.9	4.0	3.7	3.6	3.5	3.4	3.3	3.3	3.2	3.1
186.0	9.0	4.1	3.8	3.7	3.6	3.5	3.4	3.4	3.3	3.2
189.0	9.2	4.2	3.9	3.8	3.7	3.6	3.5	3.5	3.4	3.3
192.0	9.3	4.3	4.0	3.9	3.8	3.7	3.6	3.6	3.5	3.4

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

3" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
105.0	5.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0
108.0	5.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1
111.0	5.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1
114.0	5.5	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2
117.0	5.7	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3
120.0	5.8	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3
123.0	6.0	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.4
126.0	6.1	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.4
129.0	6.3	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5
132.0	6.4	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6
135.0	6.6	1.8	1.8	1.7	1.7	1.7	1.7	1.6	1.6
138.0	6.7	1.8	1.8	1.8	1.8	1.8	1.7	1.7	1.7
141.0	6.8	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8
144.0	7.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8
147.0	7.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9
150.0	7.3	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0
153.0	7.4	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1
156.0	7.6	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1
159.0	7.7	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2
162.0	7.9	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.3
165.0	8.0	2.6	2.5	2.5	2.5	2.4	2.4	2.4	2.4
168.0	8.2	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.4
171.0	8.3	2.7	2.7	2.7	2.6	2.6	2.6	2.5	2.5
174.0	8.5	2.8	2.8	2.7	2.7	2.7	2.7	2.6	2.6
177.0	8.6	2.9	2.9	2.8	2.8	2.8	2.7	2.7	2.7
180.0	8.7	3.0	3.0	2.9	2.9	2.9	2.8	2.8	2.8
183.0	8.9	3.1	3.1	3.0	3.0	2.9	2.9	2.9	2.9
186.0	9.0	3.2	3.1	3.1	3.1	3.0	3.0	3.0	2.9
189.0	9.2	3.3	3.2	3.2	3.2	3.1	3.1	3.1	3.0
192.0	9.3	3.4	3.3	3.3	3.3	3.2	3.2	3.2	3.1

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

4" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
3.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.5	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.0	1.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.5	1.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
5.0	1.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
5.5	1.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
6.0	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
6.5	1.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
7.0	1.8	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
7.5	1.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1
8.0	2.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
8.5	2.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
9.0	2.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
9.5	2.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
10.0	2.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
10.5	2.6	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
11.0	2.8	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
11.5	2.9	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3
12.0	3.0	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
12.5	3.1	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
13.0	3.3	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
13.5	3.4	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4
14.0	3.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
14.5	3.6	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
15.0	3.8	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5
15.5	3.9	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
16.0	4.0	0.8	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6
16.5	4.1	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.6
17.0	4.3	0.9	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7
17.5	4.4	0.9	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7
18.0	4.5	1.0	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8
18.5	4.6	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

4" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
3.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.5	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.5	1.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
5.0	1.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
5.5	1.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
6.0	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
6.5	1.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
7.0	1.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
7.5	1.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
8.0	2.0	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1
8.5	2.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
9.0	2.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
9.5	2.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
10.0	2.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
10.5	2.6	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
11.0	2.8	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
11.5	2.9	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
12.0	3.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
12.5	3.1	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3
13.0	3.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
13.5	3.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
14.0	3.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
14.5	3.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
15.0	3.8	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
15.5	3.9	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
16.0	4.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5
16.5	4.1	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
17.0	4.3	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
17.5	4.4	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6
18.0	4.5	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
18.5	4.6	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

4" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
19.0	4.8	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.8
19.5	4.9	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9
20.0	5.0	1.2	1.1	1.1	1.0	1.0	1.0	1.0	0.9	0.9
20.5	5.1	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0
21.0	5.3	1.3	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0
21.5	5.4	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1
22.0	5.5	1.4	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1
22.5	5.6	1.5	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2
23.0	5.8	1.5	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2
23.5	5.9	1.6	1.5	1.4	1.4	1.3	1.3	1.3	1.3	1.2
24.0	6.0	1.6	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3
24.5	6.1	1.7	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.3
25.0	6.3	1.8	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4
25.5	6.4	1.8	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.5
26.0	6.5	1.9	1.8	1.7	1.7	1.6	1.6	1.6	1.5	1.5
26.5	6.6	2.0	1.8	1.8	1.7	1.7	1.6	1.6	1.6	1.6
27.0	6.8	2.0	1.9	1.8	1.8	1.7	1.7	1.7	1.6	1.6
27.5	6.9	2.1	1.9	1.9	1.8	1.8	1.8	1.7	1.7	1.7
28.0	7.0	2.2	2.0	2.0	1.9	1.9	1.8	1.8	1.8	1.7
28.5	7.1	2.3	2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.8
29.0	7.3	2.3	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.8
29.5	7.4	2.4	2.2	2.2	2.1	2.1	2.0	2.0	1.9	1.9
30.0	7.5	2.5	2.3	2.2	2.2	2.1	2.1	2.0	2.0	2.0
30.5	7.6	2.5	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.0
31.0	7.8	2.6	2.4	2.4	2.3	2.3	2.2	2.2	2.1	2.1
31.5	7.9	2.7	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.2
32.0	8.0	2.8	2.6	2.5	2.4	2.4	2.3	2.3	2.3	2.2
32.5	8.1	2.9	2.7	2.6	2.5	2.5	2.4	2.4	2.3	2.3

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

4" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
19.0	4.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
19.5	4.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8
20.0	5.0	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8
20.5	5.1	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9
21.0	5.3	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9
21.5	5.4	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
22.0	5.5	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0
22.5	5.6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0
23.0	5.8	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1
23.5	5.9	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1
24.0	6.0	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2
24.5	6.1	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2
25.0	6.3	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3
25.5	6.4	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3
26.0	6.5	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4
26.5	6.6	1.5	1.5	1.5	1.5	1.5	1.4	1.4	1.4
27.0	6.8	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.5
27.5	6.9	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5
28.0	7.0	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6
28.5	7.1	1.8	1.7	1.7	1.7	1.7	1.7	1.6	1.6
29.0	7.3	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.7
29.5	7.4	1.9	1.9	1.8	1.8	1.8	1.8	1.7	1.7
30.0	7.5	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8
30.5	7.6	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8
31.0	7.8	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9
31.5	7.9	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0
32.0	8.0	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0
32.5	8.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

6" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
75.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
85.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
95.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105.0	1.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
115.0	1.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
125.0	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
135.0	1.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
145.0	1.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
155.0	1.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
165.0	2.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
175.0	2.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
185.0	2.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
195.0	2.4	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
205.0	2.5	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
215.0	2.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
225.0	2.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
235.0	2.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
245.0	3.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
255.0	3.1	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
265.0	3.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
275.0	3.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2
285.0	3.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
295.0	3.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
305.0	3.8	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
315.0	3.9	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
325.0	4.0	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3
335.0	4.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3
345.0	4.2	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
355.0	4.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
365.0	4.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4
375.0	4.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4
385.0	4.7	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4
395.0	4.9	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

6" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
75.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
85.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
95.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
115.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
125.0	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
135.0	1.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
145.0	1.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
155.0	1.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
165.0	2.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
175.0	2.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
185.0	2.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
195.0	2.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
205.0	2.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
215.0	2.6	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
225.0	2.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
235.0	2.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
245.0	3.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
255.0	3.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
265.0	3.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
275.0	3.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
285.0	3.5	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
295.0	3.6	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
305.0	3.8	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
315.0	3.9	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
325.0	4.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
335.0	4.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
345.0	4.2	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
355.0	4.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3
365.0	4.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
375.0	4.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
385.0	4.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
395.0	4.9	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

6" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
405.0	5.0	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
415.0	5.1	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
425.0	5.2	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5
435.0	5.4	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
445.0	5.5	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
455.0	5.6	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
465.0	5.7	0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6
475.0	5.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.6
485.0	6.0	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
495.0	6.1	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
505.0	6.2	0.9	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7
515.0	6.3	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8
525.0	6.5	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8
535.0	6.6	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
545.0	6.7	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.8
555.0	6.8	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9
565.0	7.0	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9
575.0	7.1	1.2	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9
585.0	7.2	1.2	1.1	1.1	1.0	1.0	1.0	1.0	1.0	0.9
595.0	7.3	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0
605.0	7.4	1.3	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0
615.0	7.6	1.3	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.0
625.0	7.7	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1
635.0	7.8	1.4	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1
645.0	7.9	1.4	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.1
655.0	8.1	1.5	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2
665.0	8.2	1.5	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

6" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
405.0	5.0	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4
415.0	5.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
425.0	5.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
435.0	5.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
445.0	5.5	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
455.0	5.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5
465.0	5.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
475.0	5.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
485.0	6.0	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
495.0	6.1	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6
505.0	6.2	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
515.0	6.3	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
525.0	6.5	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
535.0	6.6	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7
545.0	6.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
555.0	6.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
565.0	7.0	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8
575.0	7.1	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8
585.0	7.2	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
595.0	7.3	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9
605.0	7.4	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9
615.0	7.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9
625.0	7.7	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
635.0	7.8	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0
645.0	7.9	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0
655.0	8.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
665.0	8.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

8" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
140.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
160.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
180.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
200.0	1.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220.0	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
240.0	1.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
260.0	1.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
280.0	2.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
300.0	2.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
320.0	2.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
340.0	2.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
360.0	2.5	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
380.0	2.7	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
400.0	2.8	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
420.0	3.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
440.0	3.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
460.0	3.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
480.0	3.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
500.0	3.5	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
520.0	3.7	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
540.0	3.8	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2
560.0	3.9	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
580.0	4.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
600.0	4.2	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
620.0	4.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
640.0	4.5	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3
660.0	4.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3
680.0	4.8	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
700.0	4.9	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

8" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
140.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
160.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
180.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
200.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
240.0	1.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
260.0	1.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
280.0	2.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
300.0	2.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
320.0	2.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
340.0	2.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
360.0	2.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
380.0	2.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
400.0	2.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
420.0	3.0	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
440.0	3.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
460.0	3.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
480.0	3.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
500.0	3.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
520.0	3.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
540.0	3.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
560.0	3.9	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
580.0	4.1	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
600.0	4.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
620.0	4.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
640.0	4.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
660.0	4.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
680.0	4.8	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
700.0	4.9	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

8" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
720.0	5.1	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4
740.0	5.2	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4
760.0	5.3	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4
780.0	5.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
800.0	5.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
820.0	5.8	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
840.0	5.9	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5
860.0	6.0	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
880.0	6.2	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
900.0	6.3	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
920.0	6.5	0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6
940.0	6.6	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.6
960.0	6.7	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
980.0	6.9	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
1,000.0	7.0	0.9	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7
1,020.0	7.2	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8
1,040.0	7.3	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8
1,060.0	7.4	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
1,080.0	7.6	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.8
1,100.0	7.7	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9
1,120.0	7.9	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9
1,140.0	8.0	1.2	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9
1,160.0	8.2	1.2	1.1	1.1	1.0	1.0	1.0	1.0	1.0	0.9
1,180.0	8.3	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0
1,200.0	8.4	1.3	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0
1,220.0	8.6	1.3	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.0
1,240.0	8.7	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0
1,260.0	8.9	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0
1,280.0	9.0	1.3	1.2	1.1	1.1	1.1	1.1	1.1	1.0	1.0
1,300.0	9.1	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1
1,320.0	9.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

8" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
720.0	5.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
740.0	5.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
760.0	5.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
780.0	5.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
800.0	5.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4
820.0	5.8	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
840.0	5.9	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
860.0	6.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
880.0	6.2	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
900.0	6.3	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5
920.0	6.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
940.0	6.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
960.0	6.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
980.0	6.9	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6
1,000.0	7.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
1,020.0	7.2	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
1,040.0	7.3	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
1,060.0	7.4	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7
1,080.0	7.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
1,100.0	7.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
1,120.0	7.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8
1,140.0	8.0	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8
1,160.0	8.2	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
1,180.0	8.3	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9
1,200.0	8.4	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9
1,220.0	8.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9
1,240.0	8.7	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9
1,260.0	8.9	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
1,280.0	9.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9
1,300.0	9.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,320.0	9.3	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

10" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
210.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
240.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
270.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
300.0	1.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
330.0	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
360.0	1.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
390.0	1.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
420.0	1.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
450.0	2.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
480.0	2.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
510.0	2.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
540.0	2.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
570.0	2.5	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
600.0	2.7	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
630.0	2.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
660.0	2.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
690.0	3.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
720.0	3.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
750.0	3.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
780.0	3.5	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
810.0	3.6	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2
840.0	3.8	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
870.0	3.9	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
900.0	4.0	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
930.0	4.2	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
960.0	4.3	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3
990.0	4.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3
1,020.0	4.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
1,050.0	4.7	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
1,080.0	4.8	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4
1,110.0	5.0	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

10" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
210.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
240.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
270.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
300.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
330.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
360.0	1.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
390.0	1.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
420.0	1.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
450.0	2.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
480.0	2.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
510.0	2.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
540.0	2.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
570.0	2.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
600.0	2.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
630.0	2.8	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
660.0	2.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
690.0	3.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
720.0	3.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
750.0	3.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
780.0	3.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
810.0	3.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
840.0	3.8	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
870.0	3.9	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
900.0	4.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
930.0	4.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
960.0	4.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
990.0	4.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1,020.0	4.6	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
1,050.0	4.7	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3
1,080.0	4.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
1,110.0	5.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

10" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
1,140.0	5.1	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4
1,170.0	5.2	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
1,200.0	5.4	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
1,230.0	5.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
1,260.0	5.6	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5
1,290.0	5.8	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
1,320.0	5.9	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
1,350.0	6.0	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
1,380.0	6.2	0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6
1,410.0	6.3	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.6
1,440.0	6.4	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
1,470.0	6.6	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
1,500.0	6.7	0.9	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7
1,530.0	6.8	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8
1,560.0	7.0	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8
1,590.0	7.1	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
1,620.0	7.2	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.8
1,650.0	7.4	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9
1,680.0	7.5	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9
1,710.0	7.6	1.2	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9
1,740.0	7.8	1.2	1.1	1.1	1.0	1.0	1.0	1.0	1.0	0.9
1,770.0	7.9	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0
1,800.0	8.0	1.3	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0
1,830.0	8.2	1.3	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.0
1,860.0	8.3	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
1,890.0	8.4	0.9	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7
1,920.0	8.6	0.9	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7
1,950.0	8.7	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.7
1,980.0	8.8	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

10" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
1,140.0	5.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
1,170.0	5.2	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
1,200.0	5.4	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4
1,230.0	5.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
1,260.0	5.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
1,290.0	5.8	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
1,320.0	5.9	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
1,350.0	6.0	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5
1,380.0	6.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
1,410.0	6.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
1,440.0	6.4	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
1,470.0	6.6	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6
1,500.0	6.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
1,530.0	6.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
1,560.0	7.0	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
1,590.0	7.1	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7
1,620.0	7.2	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
1,650.0	7.4	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
1,680.0	7.5	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8
1,710.0	7.6	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8
1,740.0	7.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
1,770.0	7.9	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9
1,800.0	8.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9
1,830.0	8.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9
1,860.0	8.3	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
1,890.0	8.4	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6
1,920.0	8.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
1,950.0	8.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
1,980.0	8.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

12" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
300.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
340.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
380.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
420.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
460.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
540.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
580.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
620.0	2.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
660.0	2.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
700.0	2.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0
740.0	2.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
780.0	2.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
820.0	2.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
860.0	2.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
900.0	2.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
940.0	3.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
980.0	3.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,020.0	3.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,060.0	3.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,100.0	3.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,140.0	3.6	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,180.0	3.7	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,220.0	3.9	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
1,260.0	4.0	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1
1,300.0	4.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,340.0	4.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,380.0	4.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,420.0	4.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,460.0	4.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,500.0	4.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,540.0	4.9	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,580.0	5.0	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

12" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
300.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
340.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
380.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
420.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
460.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
500.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
540.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
580.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
620.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
660.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
700.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
740.0	2.3	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0
780.0	2.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
820.0	2.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
860.0	2.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
900.0	2.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
940.0	3.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
980.0	3.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,020.0	3.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,060.0	3.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,100.0	3.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,140.0	3.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,180.0	3.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,220.0	3.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,260.0	4.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,300.0	4.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,340.0	4.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1
1,380.0	4.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,420.0	4.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,460.0	4.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,500.0	4.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,540.0	4.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,580.0	5.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

12" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
1,620.0	5.1	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
1,660.0	5.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
1,700.0	5.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2
1,740.0	5.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1,780.0	5.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1,820.0	5.7	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1,860.0	5.9	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1,900.0	6.0	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1,940.0	6.1	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
1,980.0	6.2	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3
2,020.0	6.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3
2,060.0	6.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
2,100.0	6.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
2,140.0	6.8	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
2,180.0	6.9	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
2,220.0	7.0	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4
2,260.0	7.1	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
2,300.0	7.3	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4
2,340.0	7.4	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4
2,380.0	7.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2,420.0	7.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2,460.0	7.8	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2,500.0	7.9	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
2,540.0	8.0	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5
2,580.0	8.1	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5
2,620.0	8.3	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5
2,660.0	8.4	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

12" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – PSI per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
1,620.0	5.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,660.0	5.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,700.0	5.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,740.0	5.5	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
1,780.0	5.6	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
1,820.0	5.7	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1,860.0	5.9	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1,900.0	6.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1,940.0	6.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1,980.0	6.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
2,020.0	6.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
2,060.0	6.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
2,100.0	6.6	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3
2,140.0	6.8	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3
2,180.0	6.9	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
2,220.0	7.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
2,260.0	7.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
2,300.0	7.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
2,340.0	7.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
2,380.0	7.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
2,420.0	7.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4
2,460.0	7.8	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4
2,500.0	7.9	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2,540.0	8.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2,580.0	8.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2,620.0	8.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2,660.0	8.4	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

Appendix C: Friction Loss Charts (Feet of Head)

½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
0.8	1.1	1.9	1.7	1.6	1.6	1.5	1.5	1.4	1.4	1.3
0.9	1.2	2.3	2.1	2.0	1.9	1.8	1.8	1.7	1.7	1.6
1.0	1.4	2.8	2.5	2.4	2.3	2.2	2.1	2.1	2.0	2.0
1.1	1.5	3.3	2.9	2.8	2.7	2.6	2.5	2.5	2.4	2.3
1.2	1.6	3.8	3.4	3.3	3.1	3.0	2.9	2.9	2.8	2.7
1.3	1.8	4.4	3.9	3.7	3.6	3.5	3.4	3.3	3.2	3.1
1.4	1.9	5.0	4.4	4.3	4.1	4.0	3.8	3.7	3.6	3.6
1.5	2.1	5.6	5.0	4.8	4.6	4.5	4.3	4.2	4.1	4.0
1.6	2.2	6.2	5.6	5.4	5.2	5.0	4.9	4.7	4.6	4.5
1.7	2.3	6.9	6.2	6.0	5.7	5.6	5.4	5.2	5.1	5.0
1.8	2.5	7.6	6.8	6.6	6.3	6.1	6.0	5.8	5.7	5.5
1.9	2.6	8.4	7.5	7.2	7.0	6.8	6.6	6.4	6.2	6.1
2.0	2.7	9.2	8.2	7.9	7.6	7.4	7.2	7.0	6.8	6.7
2.1	2.9	10.0	8.9	8.6	8.3	8.0	7.8	7.6	7.4	7.3
2.2	3.0	10.8	9.7	9.3	9.0	8.7	8.5	8.3	8.1	7.9
2.3	3.2	11.7	10.5	10.1	9.7	9.4	9.2	8.9	8.7	8.5
2.4	3.3	12.5	11.3	10.9	10.5	10.2	9.9	9.6	9.4	9.2
2.5	3.4	13.5	12.1	11.7	11.3	10.9	10.6	10.3	10.1	9.9
2.6	3.6	14.4	13.0	12.5	12.1	11.7	11.4	11.1	10.8	10.6
2.7	3.7	15.4	13.9	13.3	12.9	12.5	12.2	11.8	11.6	11.3
2.8	3.8	16.4	14.8	14.2	13.7	13.3	13.0	12.6	12.3	12.1
2.9	4.0	17.4	15.7	15.1	14.6	14.2	13.8	13.4	13.1	12.9
3.0	4.1	18.5	16.7	16.0	15.5	15.0	14.6	14.3	13.9	13.7
3.1	4.2	19.5	17.6	17.0	16.4	15.9	15.5	15.1	14.8	14.5
3.2	4.4	20.7	18.7	18.0	17.4	16.9	16.4	16.0	15.6	15.3
3.3	4.5	21.8	19.7	19.0	18.3	17.8	17.3	16.9	16.5	16.2
3.4	4.7	23.0	20.7	20.0	19.3	18.8	18.3	17.8	17.4	17.1
3.5	4.8	24.1	21.8	21.0	20.4	19.8	19.2	18.8	18.3	18.0
3.6	4.9	25.4	22.9	22.1	21.4	20.8	20.2	19.7	19.3	18.9
3.7	5.1	26.6	24.1	23.2	22.5	21.8	21.2	20.7	20.2	19.8
3.8	5.2	27.9	25.2	24.3	23.5	22.9	22.2	21.7	21.2	20.8
3.9	5.3	29.2	26.4	25.5	24.6	23.9	23.3	22.7	22.2	21.8
4.0	5.5	30.5	27.6	26.6	25.8	25.0	24.4	23.8	23.3	22.8

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
0.8	1.1	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2
0.9	1.2	1.6	1.6	1.5	1.5	1.5	1.5	1.4	1.4
1.0	1.4	1.9	1.9	1.9	1.8	1.8	1.8	1.7	1.7
1.1	1.5	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.0
1.2	1.6	2.7	2.6	2.6	2.5	2.5	2.4	2.4	2.4
1.3	1.8	3.1	3.0	2.9	2.9	2.8	2.8	2.8	2.7
1.4	1.9	3.5	3.4	3.3	3.3	3.2	3.2	3.1	3.1
1.5	2.1	3.9	3.9	3.8	3.7	3.7	3.6	3.5	3.5
1.6	2.2	4.4	4.3	4.2	4.2	4.1	4.0	4.0	3.9
1.7	2.3	4.9	4.8	4.7	4.6	4.6	4.5	4.4	4.4
1.8	2.5	5.4	5.3	5.2	5.1	5.0	5.0	4.9	4.8
1.9	2.6	6.0	5.8	5.7	5.6	5.6	5.5	5.4	5.3
2.0	2.7	6.5	6.4	6.3	6.2	6.1	6.0	5.9	5.8
2.1	2.9	7.1	7.0	6.9	6.7	6.6	6.5	6.4	6.4
2.2	3.0	7.7	7.6	7.4	7.3	7.2	7.1	7.0	6.9
2.3	3.2	8.4	8.2	8.1	7.9	7.8	7.7	7.6	7.5
2.4	3.3	9.0	8.8	8.7	8.5	8.4	8.3	8.2	8.1
2.5	3.4	9.7	9.5	9.3	9.2	9.0	8.9	8.8	8.7
2.6	3.6	10.4	10.2	10.0	9.9	9.7	9.6	9.4	9.3
2.7	3.7	11.1	10.9	10.7	10.5	10.4	10.2	10.1	10.0
2.8	3.8	11.8	11.6	11.4	11.2	11.1	10.9	10.8	10.6
2.9	4.0	12.6	12.4	12.2	12.0	11.8	11.6	11.5	11.3
3.0	4.1	13.4	13.1	12.9	12.7	12.5	12.4	12.2	12.1
3.1	4.2	14.2	13.9	13.7	13.5	13.3	13.1	12.9	12.8
3.2	4.4	15.0	14.7	14.5	14.3	14.1	13.9	13.7	13.5
3.3	4.5	15.9	15.6	15.3	15.1	14.9	14.7	14.5	14.3
3.4	4.7	16.7	16.4	16.2	15.9	15.7	15.5	15.3	15.1
3.5	4.8	17.6	17.3	17.0	16.8	16.5	16.3	16.1	15.9
3.6	4.9	18.5	18.2	17.9	17.6	17.4	17.1	16.9	16.7
3.7	5.1	19.5	19.1	18.8	18.5	18.2	18.0	17.8	17.6
3.8	5.2	20.4	20.0	19.7	19.4	19.1	18.9	18.7	18.4
3.9	5.3	21.4	21.0	20.7	20.4	20.1	19.8	19.6	19.3
4.0	5.5	22.4	22.0	21.6	21.3	21.0	20.7	20.5	20.2

½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
4.1	5.6	31.8	28.8	27.8	26.9	26.1	25.5	24.9	24.3	23.8
4.2	5.8	33.2	30.1	29.0	28.1	27.3	26.6	25.9	25.4	24.9
4.3	5.9	34.6	31.3	30.2	29.3	28.4	27.7	27.1	26.5	25.9
4.4	6.0	36.0	32.6	31.5	30.5	29.6	28.9	28.2	27.6	27.0
4.5	6.2	37.4	34.0	32.8	31.7	30.8	30.0	29.3	28.7	28.1
4.6	6.3	38.9	35.3	34.1	33.0	32.1	31.2	30.5	29.9	29.3
4.7	6.4	40.4	36.7	35.4	34.3	33.3	32.5	31.7	31.0	30.4
4.8	6.6	41.9	38.1	36.7	35.6	34.6	33.7	32.9	32.2	31.6
4.9	6.7	43.4	39.5	38.1	36.9	35.9	35.0	34.2	33.4	32.8
5.0	6.9	45.0	40.9	39.5	38.3	37.2	36.2	35.4	34.7	34.0
5.1	7.0	46.6	42.4	40.9	39.6	38.5	37.6	36.7	35.9	35.2
5.2	7.1	48.2	43.8	42.3	41.0	39.9	38.9	38.0	37.2	36.5
5.3	7.3	49.9	45.3	43.8	42.4	41.3	40.2	39.3	38.5	37.7
5.4	7.4	51.5	46.9	45.3	43.9	42.7	41.6	40.6	39.8	39.0
5.5	7.5	53.2	48.4	46.7	45.3	44.1	43.0	42.0	41.1	40.3
5.6	7.7	54.9	50.0	48.3	46.8	45.5	44.4	43.4	42.5	41.6
5.7	7.8	56.7	51.6	49.8	48.3	47.0	45.8	44.8	43.8	43.0
5.8	7.9	58.4	53.2	51.4	49.8	48.4	47.2	46.2	45.2	44.4
5.9	8.1	60.2	54.8	53.0	51.4	50.0	48.7	47.6	46.6	45.7
6.0	8.2	62.0	56.5	54.6	52.9	51.5	50.2	49.1	48.1	47.1
6.1	8.4	63.8	58.1	56.2	54.5	53.0	51.7	50.5	49.5	48.6
6.2	8.5	65.7	59.8	57.8	56.1	54.6	53.2	52.0	51.0	50.0

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
4.1	5.6	23.4	23.0	22.6	22.3	21.9	21.7	21.4	21.2
4.2	5.8	24.4	24.0	23.6	23.2	22.9	22.6	22.3	22.1
4.3	5.9	25.5	25.0	24.6	24.3	23.9	23.6	23.3	23.1
4.4	6.0	26.5	26.1	25.7	25.3	24.9	24.6	24.3	24.0
4.5	6.2	27.6	27.1	26.7	26.3	26.0	25.6	25.3	25.0
4.6	6.3	28.7	28.2	27.8	27.4	27.0	26.7	26.3	26.0
4.7	6.4	29.9	29.4	28.9	28.5	28.1	27.7	27.4	27.1
4.8	6.6	31.0	30.5	30.0	29.6	29.2	28.8	28.5	28.1
4.9	6.7	32.2	31.6	31.1	30.7	30.3	29.9	29.5	29.2
5.0	6.9	33.4	32.8	32.3	31.8	31.4	31.0	30.6	30.3
5.1	7.0	34.6	34.0	33.5	33.0	32.5	32.1	31.8	31.4
5.2	7.1	35.8	35.2	34.7	34.2	33.7	33.3	32.9	32.5
5.3	7.3	37.0	36.4	35.9	35.4	34.9	34.4	34.0	33.7
5.4	7.4	38.3	37.7	37.1	36.6	36.1	35.6	35.2	34.8
5.5	7.5	39.6	38.9	38.4	37.8	37.3	36.8	36.4	36.0
5.6	7.7	40.9	40.2	39.6	39.1	38.5	38.1	37.6	37.2
5.7	7.8	42.2	41.5	40.9	40.3	39.8	39.3	38.9	38.4
5.8	7.9	43.6	42.9	42.2	41.6	41.1	40.6	40.1	39.7
5.9	8.1	44.9	44.2	43.5	42.9	42.4	41.8	41.4	40.9
6.0	8.2	46.3	45.6	44.9	44.3	43.7	43.1	42.7	42.2
6.1	8.4	47.7	46.9	46.2	45.6	45.0	44.5	44.0	43.5
6.2	8.5	49.1	48.3	47.6	47.0	46.3	45.8	45.3	44.8

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

¾" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
1.0	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
1.2	0.9	0.9	0.8	0.8	0.7	0.7	0.7	0.7	0.6	0.6
1.4	1.0	1.2	1.0	1.0	1.0	0.9	0.9	0.9	0.8	0.8
1.6	1.2	1.5	1.3	1.3	1.2	1.2	1.1	1.1	1.1	1.0
1.8	1.3	1.8	1.6	1.5	1.5	1.4	1.4	1.3	1.3	1.3
2.0	1.5	2.2	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.5
2.2	1.6	2.5	2.3	2.2	2.1	2.0	2.0	1.9	1.9	1.8
2.4	1.8	2.9	2.6	2.5	2.4	2.4	2.3	2.2	2.2	2.1
2.6	1.9	3.4	3.0	2.9	2.8	2.7	2.6	2.6	2.5	2.4
2.8	2.1	3.8	3.4	3.3	3.2	3.1	3.0	2.9	2.9	2.8
3.0	2.2	4.3	3.9	3.7	3.6	3.5	3.4	3.3	3.2	3.1
3.2	2.4	4.8	4.3	4.2	4.0	3.9	3.8	3.7	3.6	3.5
3.4	2.5	5.4	4.8	4.6	4.5	4.3	4.2	4.1	4.0	3.9
3.6	2.7	5.9	5.3	5.1	5.0	4.8	4.7	4.6	4.4	4.3
3.8	2.8	6.5	5.9	5.6	5.5	5.3	5.1	5.0	4.9	4.8
4.0	3.0	7.1	6.4	6.2	6.0	5.8	5.6	5.5	5.4	5.2
4.2	3.1	7.7	7.0	6.7	6.5	6.3	6.1	6.0	5.8	5.7
4.4	3.3	8.4	7.6	7.3	7.1	6.8	6.7	6.5	6.3	6.2
4.6	3.4	9.1	8.2	7.9	7.6	7.4	7.2	7.0	6.9	6.7
4.8	3.6	9.8	8.8	8.5	8.2	8.0	7.8	7.6	7.4	7.2
5.0	3.7	10.5	9.5	9.1	8.8	8.6	8.3	8.1	8.0	7.8
5.2	3.9	11.2	10.1	9.8	9.5	9.2	8.9	8.7	8.5	8.4
5.4	4.0	12.0	10.8	10.5	10.1	9.8	9.6	9.3	9.1	8.9
5.6	4.2	12.8	11.6	11.1	10.8	10.5	10.2	10.0	9.7	9.5
5.8	4.3	13.6	12.3	11.9	11.5	11.1	10.9	10.6	10.4	10.1
6.0	4.5	14.4	13.1	12.6	12.2	11.8	11.5	11.2	11.0	10.8
6.2	4.6	15.2	13.8	13.3	12.9	12.5	12.2	11.9	11.7	11.4
6.4	4.7	16.1	14.6	14.1	13.7	13.3	12.9	12.6	12.3	12.1
6.6	4.9	17.0	15.4	14.9	14.4	14.0	13.7	13.3	13.0	12.8
6.8	5.0	17.9	16.3	15.7	15.2	14.8	14.4	14.1	13.8	13.5

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

¾" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
1.0	0.7	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
1.2	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5
1.4	1.0	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
1.6	1.2	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9
1.8	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1
2.0	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.3
2.2	1.6	1.8	1.8	1.7	1.7	1.7	1.6	1.6	1.6
2.4	1.8	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9
2.6	1.9	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.1
2.8	2.1	2.7	2.7	2.6	2.6	2.5	2.5	2.5	2.4
3.0	2.2	3.1	3.0	3.0	2.9	2.9	2.8	2.8	2.8
3.2	2.4	3.5	3.4	3.3	3.3	3.2	3.2	3.1	3.1
3.4	2.5	3.8	3.8	3.7	3.7	3.6	3.5	3.5	3.5
3.6	2.7	4.3	4.2	4.1	4.0	4.0	3.9	3.9	3.8
3.8	2.8	4.7	4.6	4.5	4.4	4.4	4.3	4.3	4.2
4.0	3.0	5.1	5.0	5.0	4.9	4.8	4.7	4.7	4.6
4.2	3.1	5.6	5.5	5.4	5.3	5.2	5.2	5.1	5.0
4.4	3.3	6.1	6.0	5.9	5.8	5.7	5.6	5.5	5.5
4.6	3.4	6.6	6.5	6.4	6.3	6.2	6.1	6.0	5.9
4.8	3.6	7.1	7.0	6.9	6.8	6.7	6.6	6.5	6.4
5.0	3.7	7.6	7.5	7.4	7.3	7.2	7.1	7.0	6.9
5.2	3.9	8.2	8.0	7.9	7.8	7.7	7.6	7.5	7.4
5.4	4.0	8.8	8.6	8.5	8.3	8.2	8.1	8.0	7.9
5.6	4.2	9.4	9.2	9.0	8.9	8.8	8.7	8.5	8.4
5.8	4.3	10.0	9.8	9.6	9.5	9.3	9.2	9.1	9.0
6.0	4.5	10.6	10.4	10.2	10.1	9.9	9.8	9.7	9.6
6.2	4.6	11.2	11.0	10.8	10.7	10.5	10.4	10.3	10.1
6.4	4.7	11.9	11.7	11.5	11.3	11.1	11.0	10.9	10.7
6.6	4.9	12.5	12.3	12.1	12.0	11.8	11.6	11.5	11.4
6.8	5.0	13.2	13.0	12.8	12.6	12.4	12.3	12.1	12.0

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

¾" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
7.0	5.2	18.9	17.1	16.5	16.0	15.6	15.2	14.8	14.5	14.2
7.2	5.3	19.8	18.0	17.4	16.8	16.4	15.9	15.6	15.2	14.9
7.4	5.5	20.8	18.9	18.2	17.7	17.2	16.7	16.3	16.0	15.7
7.6	5.6	21.8	19.8	19.1	18.5	18.0	17.6	17.1	16.8	16.5
7.8	5.8	22.8	20.7	20.0	19.4	18.9	18.4	18.0	17.6	17.2
8.0	5.9	23.8	21.7	20.9	20.3	19.7	19.2	18.8	18.4	18.0
8.2	6.1	24.9	22.6	21.9	21.2	20.6	20.1	19.6	19.2	18.9
8.4	6.2	26.0	23.6	22.8	22.1	21.5	21.0	20.5	20.1	19.7
8.6	6.4	27.1	24.6	23.8	23.1	22.4	21.9	21.4	20.9	20.5
8.8	6.5	28.2	25.7	24.8	24.0	23.4	22.8	22.3	21.8	21.4
9.0	6.7	29.3	26.7	25.8	25.0	24.3	23.7	23.2	22.7	22.3
9.2	6.8	30.5	27.8	26.8	26.0	25.3	24.7	24.1	23.6	23.2
9.4	7.0	31.6	28.8	27.9	27.0	26.3	25.7	25.1	24.6	24.1
9.6	7.1	32.8	29.9	28.9	28.1	27.3	26.7	26.1	25.5	25.0
9.8	7.3	34.1	31.1	30.0	29.1	28.3	27.7	27.0	26.5	26.0
10.0	7.4	35.3	32.2	31.1	30.2	29.4	28.7	28.0	27.5	26.9
10.2	7.6	36.5	33.3	32.2	31.3	30.4	29.7	29.0	28.5	27.9
10.4	7.7	37.8	34.5	33.4	32.4	31.5	30.8	30.1	29.5	28.9
10.6	7.9	39.1	35.7	34.5	33.5	32.6	31.8	31.1	30.5	29.9
10.8	8.0	40.4	36.9	35.7	34.6	33.7	32.9	32.2	31.5	31.0
11.0	8.2	41.8	38.1	36.9	35.8	34.9	34.0	33.3	32.6	32.0
11.2	8.3	43.1	39.4	38.1	37.0	36.0	35.1	34.4	33.7	33.1
11.4	8.5	44.5	40.6	39.3	38.2	37.2	36.3	35.5	34.8	34.1
11.6	8.6	45.9	41.9	40.5	39.4	38.3	37.4	36.6	35.9	35.2
11.8	8.8	47.3	43.2	41.8	40.6	39.5	38.6	37.7	37.0	36.3

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

¾" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
7.0	5.2	13.9	13.7	13.5	13.3	13.1	12.9	12.8	12.6
7.2	5.3	14.7	14.4	14.2	14.0	13.8	13.6	13.4	13.3
7.4	5.5	15.4	15.1	14.9	14.7	14.5	14.3	14.1	14.0
7.6	5.6	16.2	15.9	15.6	15.4	15.2	15.0	14.8	14.7
7.8	5.8	16.9	16.6	16.4	16.1	15.9	15.7	15.5	15.4
8.0	5.9	17.7	17.4	17.2	16.9	16.7	16.5	16.3	16.1
8.2	6.1	18.5	18.2	17.9	17.7	17.4	17.2	17.0	16.8
8.4	6.2	19.3	19.0	18.7	18.5	18.2	18.0	17.8	17.6
8.6	6.4	20.2	19.8	19.5	19.3	19.0	18.8	18.6	18.3
8.8	6.5	21.0	20.7	20.4	20.1	19.8	19.6	19.3	19.1
9.0	6.7	21.9	21.5	21.2	20.9	20.6	20.4	20.1	19.9
9.2	6.8	22.8	22.4	22.1	21.8	21.5	21.2	21.0	20.7
9.4	7.0	23.7	23.3	22.9	22.6	22.3	22.1	21.8	21.6
9.6	7.1	24.6	24.2	23.8	23.5	23.2	22.9	22.7	22.4
9.8	7.3	25.5	25.1	24.7	24.4	24.1	23.8	23.5	23.3
10.0	7.4	26.5	26.1	25.7	25.3	25.0	24.7	24.4	24.1
10.2	7.6	27.4	27.0	26.6	26.2	25.9	25.6	25.3	25.0
10.4	7.7	28.4	28.0	27.6	27.2	26.8	26.5	26.2	25.9
10.6	7.9	29.4	28.9	28.5	28.1	27.8	27.4	27.1	26.8
10.8	8.0	30.4	29.9	29.5	29.1	28.7	28.4	28.1	27.8
11.0	8.2	31.5	31.0	30.5	30.1	29.7	29.3	29.0	28.7
11.2	8.3	32.5	32.0	31.5	31.1	30.7	30.3	30.0	29.7
11.4	8.5	33.5	33.0	32.5	32.1	31.7	31.3	31.0	30.7
11.6	8.6	34.6	34.1	33.6	33.1	32.7	32.3	32.0	31.6
11.8	8.8	35.7	35.2	34.6	34.2	33.7	33.3	33.0	32.6

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
2.0	0.9	0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
2.5	1.1	1.0	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
3.0	1.3	1.3	1.2	1.1	1.1	1.0	1.0	1.0	1.0	0.9
3.5	1.6	1.7	1.5	1.5	1.4	1.4	1.3	1.3	1.3	1.2
4.0	1.8	2.1	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.6
4.5	2.0	2.6	2.4	2.3	2.2	2.1	2.1	2.0	2.0	1.9
5.0	2.2	3.1	2.8	2.7	2.6	2.5	2.5	2.4	2.4	2.3
5.5	2.5	3.7	3.3	3.2	3.1	3.0	2.9	2.9	2.8	2.7
6.0	2.7	4.3	3.9	3.7	3.6	3.5	3.4	3.3	3.3	3.2
6.5	2.9	4.9	4.5	4.3	4.2	4.0	3.9	3.8	3.8	3.7
7.0	3.1	5.6	5.1	4.9	4.7	4.6	4.5	4.4	4.3	4.2
7.5	3.3	6.3	5.7	5.5	5.4	5.2	5.1	4.9	4.8	4.7
8.0	3.6	7.1	6.4	6.2	6.0	5.8	5.7	5.5	5.4	5.3
8.5	3.8	7.9	7.2	6.9	6.7	6.5	6.3	6.2	6.0	5.9
9.0	4.0	8.7	7.9	7.6	7.4	7.2	7.0	6.8	6.7	6.6
9.5	4.2	9.6	8.7	8.4	8.1	7.9	7.7	7.5	7.4	7.2
10.0	4.5	10.5	9.5	9.2	8.9	8.7	8.5	8.3	8.1	7.9
10.5	4.7	11.4	10.4	10.0	9.7	9.5	9.2	9.0	8.8	8.6
11.0	4.9	12.4	11.3	10.9	10.6	10.3	10.0	9.8	9.6	9.4
11.5	5.1	13.4	12.2	11.8	11.4	11.1	10.8	10.6	10.4	10.2
12.0	5.4	14.5	13.2	12.7	12.3	12.0	11.7	11.4	11.2	11.0

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
2.0	0.9	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
2.5	1.1	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
3.0	1.3	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8
3.5	1.6	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1
4.0	1.8	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.4
4.5	2.0	1.9	1.8	1.8	1.8	1.7	1.7	1.7	1.7
5.0	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.0
5.5	2.5	2.7	2.6	2.6	2.5	2.5	2.5	2.4	2.4
6.0	2.7	3.1	3.1	3.0	3.0	2.9	2.9	2.8	2.8
6.5	2.9	3.6	3.5	3.5	3.4	3.4	3.3	3.3	3.2
7.0	3.1	4.1	4.0	4.0	3.9	3.8	3.8	3.7	3.7
7.5	3.3	4.6	4.6	4.5	4.4	4.4	4.3	4.2	4.2
8.0	3.6	5.2	5.1	5.0	5.0	4.9	4.8	4.8	4.7
8.5	3.8	5.8	5.7	5.6	5.5	5.5	5.4	5.3	5.3
9.0	4.0	6.4	6.3	6.2	6.1	6.0	6.0	5.9	5.8
9.5	4.2	7.1	7.0	6.9	6.8	6.7	6.6	6.5	6.4
10.0	4.5	7.8	7.6	7.5	7.4	7.3	7.2	7.1	7.0
10.5	4.7	8.5	8.3	8.2	8.1	8.0	7.9	7.8	7.7
11.0	4.9	9.2	9.1	8.9	8.8	8.7	8.6	8.5	8.4
11.5	5.1	10.0	9.8	9.7	9.5	9.4	9.3	9.2	9.1
12.0	5.4	10.8	10.6	10.4	10.3	10.2	10.0	9.9	9.8

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
12.5	5.6	15.5	14.2	13.7	13.3	12.9	12.6	12.3	12.0	11.8
13.0	5.8	16.6	15.2	14.7	14.2	13.8	13.5	13.2	12.9	12.7
13.5	6.0	17.8	16.2	15.7	15.2	14.8	14.4	14.1	13.8	13.6
14.0	6.2	19.0	17.3	16.7	16.2	15.8	15.4	15.1	14.8	14.5
14.5	6.5	20.2	18.4	17.8	17.3	16.8	16.4	16.1	15.7	15.4
15.0	6.7	21.4	19.6	18.9	18.4	17.9	17.5	17.1	16.7	16.4
15.5	6.9	22.7	20.7	20.1	19.5	19.0	18.5	18.1	17.7	17.4
16.0	7.1	24.0	22.0	21.2	20.6	20.1	19.6	19.2	18.8	18.4
16.5	7.4	25.4	23.2	22.4	21.8	21.2	20.7	20.3	19.9	19.5
17.0	7.6	26.7	24.5	23.7	23.0	22.4	21.8	21.4	21.0	20.6
17.5	7.8	28.1	25.8	24.9	24.2	23.6	23.0	22.5	22.1	21.7
18.0	8.0	29.6	27.1	26.2	25.5	24.8	24.2	23.7	23.2	22.8
18.5	8.3	31.1	28.4	27.5	26.7	26.0	25.4	24.9	24.4	24.0
19.0	8.5	32.6	29.8	28.9	28.1	27.3	26.7	26.1	25.6	25.1
19.5	8.7	34.1	31.2	30.2	29.4	28.6	28.0	27.4	26.8	26.4
20.0	8.9	35.7	32.7	31.6	30.8	30.0	29.3	28.7	28.1	27.6
20.5	9.1	37.3	34.2	33.1	32.1	31.3	30.6	30.0	29.4	28.9
21.0	9.4	38.9	35.7	34.5	33.6	32.7	32.0	31.3	30.7	30.1
21.5	9.6	40.6	37.2	36.0	35.0	34.1	33.4	32.7	32.0	31.5
22.0	9.8	42.2	38.8	37.5	36.5	35.6	34.8	34.0	33.4	32.8
22.5	10.0	44.0	40.3	39.1	38.0	37.0	36.2	35.5	34.8	34.2

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
12.5	5.6	11.6	11.4	11.2	11.1	10.9	10.8	10.7	10.6
13.0	5.8	12.5	12.3	12.1	11.9	11.7	11.6	11.5	11.3
13.5	6.0	13.3	13.1	12.9	12.7	12.6	12.4	12.3	12.1
14.0	6.2	14.2	14.0	13.8	13.6	13.4	13.3	13.1	13.0
14.5	6.5	15.2	14.9	14.7	14.5	14.3	14.1	14.0	13.8
15.0	6.7	16.1	15.9	15.6	15.4	15.2	15.0	14.9	14.7
15.5	6.9	17.1	16.8	16.6	16.4	16.1	16.0	15.8	15.6
16.0	7.1	18.1	17.8	17.6	17.3	17.1	16.9	16.7	16.5
16.5	7.4	19.2	18.9	18.6	18.3	18.1	17.9	17.7	17.5
17.0	7.6	20.2	19.9	19.6	19.3	19.1	18.9	18.7	18.5
17.5	7.8	21.3	21.0	20.7	20.4	20.1	19.9	19.7	19.5
18.0	8.0	22.4	22.1	21.8	21.5	21.2	20.9	20.7	20.5
18.5	8.3	23.6	23.2	22.9	22.6	22.3	22.0	21.8	21.6
19.0	8.5	24.7	24.4	24.0	23.7	23.4	23.1	22.9	22.6
19.5	8.7	25.9	25.5	25.2	24.8	24.5	24.2	24.0	23.7
20.0	8.9	27.1	26.7	26.4	26.0	25.7	25.4	25.1	24.9
20.5	9.1	28.4	28.0	27.6	27.2	26.9	26.6	26.3	26.0
21.0	9.4	29.7	29.2	28.8	28.4	28.1	27.8	27.5	27.2
21.5	9.6	31.0	30.5	30.1	29.7	29.3	29.0	28.7	28.4
22.0	9.8	32.3	31.8	31.3	30.9	30.6	30.2	29.9	29.6
22.5	10.0	33.6	33.1	32.7	32.2	31.8	31.5	31.2	30.9

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1¼" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
3.0	0.8	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2
3.5	0.9	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3
4.0	1.0	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
4.5	1.1	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
5.0	1.3	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
5.5	1.4	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
6.0	1.5	1.1	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8
6.5	1.6	1.3	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9
7.0	1.8	1.4	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1
7.5	1.9	1.6	1.5	1.4	1.4	1.3	1.3	1.2	1.2	1.2
8.0	2.0	1.8	1.6	1.6	1.5	1.5	1.4	1.4	1.4	1.3
8.5	2.1	2.0	1.8	1.7	1.7	1.6	1.6	1.5	1.5	1.5
9.0	2.3	2.2	2.0	1.9	1.9	1.8	1.8	1.7	1.7	1.6
9.5	2.4	2.4	2.2	2.1	2.0	2.0	1.9	1.9	1.8	1.8
10.0	2.5	2.7	2.4	2.3	2.2	2.2	2.1	2.1	2.0	2.0
10.5	2.6	2.9	2.6	2.5	2.4	2.4	2.3	2.3	2.2	2.2
11.0	2.8	3.1	2.8	2.7	2.7	2.6	2.5	2.4	2.4	2.3
11.5	2.9	3.4	3.1	3.0	2.9	2.8	2.7	2.6	2.6	2.5
12.0	3.0	3.6	3.3	3.2	3.1	3.0	2.9	2.9	2.8	2.7
12.5	3.1	3.9	3.6	3.4	3.3	3.2	3.1	3.1	3.0	2.9
13.0	3.3	4.2	3.8	3.7	3.6	3.5	3.4	3.3	3.2	3.2
13.5	3.4	4.5	4.1	3.9	3.8	3.7	3.6	3.5	3.4	3.4
14.0	3.5	4.8	4.3	4.2	4.1	4.0	3.9	3.8	3.7	3.6
14.5	3.6	5.1	4.6	4.5	4.3	4.2	4.1	4.0	3.9	3.8
15.0	3.8	5.4	4.9	4.7	4.6	4.5	4.4	4.3	4.2	4.1
15.5	3.9	5.7	5.2	5.0	4.9	4.7	4.6	4.5	4.4	4.3
16.0	4.0	6.0	5.5	5.3	5.2	5.0	4.9	4.8	4.7	4.6
16.5	4.1	6.4	5.8	5.6	5.4	5.3	5.2	5.0	4.9	4.8
17.0	4.3	6.7	6.1	5.9	5.7	5.6	5.4	5.3	5.2	5.1
17.5	4.4	7.1	6.5	6.2	6.0	5.9	5.7	5.6	5.5	5.4
18.0	4.5	7.4	6.8	6.6	6.4	6.2	6.0	5.9	5.8	5.7
18.5	4.6	7.8	7.1	6.9	6.7	6.5	6.3	6.2	6.1	5.9

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1¼" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
3.0	0.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
3.5	0.9	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
4.0	1.0	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3
4.5	1.1	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
5.0	1.3	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
5.5	1.4	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
6.0	1.5	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7
6.5	1.6	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
7.0	1.8	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9
7.5	1.9	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.0
8.0	2.0	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2
8.5	2.1	1.5	1.4	1.4	1.4	1.4	1.3	1.3	1.3
9.0	2.3	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.4
9.5	2.4	1.8	1.7	1.7	1.7	1.7	1.6	1.6	1.6
10.0	2.5	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.7
10.5	2.6	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9
11.0	2.8	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1
11.5	2.9	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.2
12.0	3.0	2.7	2.6	2.6	2.6	2.5	2.5	2.5	2.4
12.5	3.1	2.9	2.8	2.8	2.8	2.7	2.7	2.6	2.6
13.0	3.3	3.1	3.0	3.0	3.0	2.9	2.9	2.8	2.8
13.5	3.4	3.3	3.3	3.2	3.2	3.1	3.1	3.0	3.0
14.0	3.5	3.5	3.5	3.4	3.4	3.3	3.3	3.2	3.2
14.5	3.6	3.8	3.7	3.6	3.6	3.5	3.5	3.5	3.4
15.0	3.8	4.0	3.9	3.9	3.8	3.8	3.7	3.7	3.6
15.5	3.9	4.2	4.2	4.1	4.1	4.0	3.9	3.9	3.9
16.0	4.0	4.5	4.4	4.4	4.3	4.2	4.2	4.1	4.1
16.5	4.1	4.8	4.7	4.6	4.5	4.5	4.4	4.4	4.3
17.0	4.3	5.0	4.9	4.9	4.8	4.7	4.7	4.6	4.6
17.5	4.4	5.3	5.2	5.1	5.0	5.0	4.9	4.9	4.8
18.0	4.5	5.6	5.5	5.4	5.3	5.2	5.2	5.1	5.1
18.5	4.6	5.8	5.7	5.7	5.6	5.5	5.4	5.4	5.3

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1¼" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
19.0	4.8	8.2	7.5	7.2	7.0	6.8	6.6	6.5	6.4	6.2
19.5	4.9	8.6	7.8	7.6	7.3	7.1	7.0	6.8	6.7	6.5
20.0	5.0	9.0	8.2	7.9	7.7	7.5	7.3	7.1	7.0	6.8
20.5	5.1	9.4	8.5	8.3	8.0	7.8	7.6	7.4	7.3	7.2
21.0	5.3	9.8	8.9	8.6	8.4	8.1	7.9	7.8	7.6	7.5
21.5	5.4	10.2	9.3	9.0	8.7	8.5	8.3	8.1	7.9	7.8
22.0	5.5	10.6	9.7	9.4	9.1	8.9	8.6	8.4	8.3	8.1
22.5	5.6	11.0	10.1	9.8	9.5	9.2	9.0	8.8	8.6	8.5
23.0	5.8	11.5	10.5	10.1	9.8	9.6	9.4	9.1	9.0	8.8
23.5	5.9	11.9	10.9	10.5	10.2	10.0	9.7	9.5	9.3	9.1
24.0	6.0	12.4	11.3	10.9	10.6	10.3	10.1	9.9	9.7	9.5
24.5	6.1	12.8	11.7	11.4	11.0	10.7	10.5	10.2	10.0	9.9
25.0	6.3	13.3	12.2	11.8	11.4	11.1	10.9	10.6	10.4	10.2
25.5	6.4	13.8	12.6	12.2	11.8	11.5	11.3	11.0	10.8	10.6
26.0	6.5	14.2	13.0	12.6	12.3	11.9	11.7	11.4	11.2	11.0
26.5	6.6	14.7	13.5	13.1	12.7	12.4	12.1	11.8	11.6	11.4
27.0	6.8	15.2	13.9	13.5	13.1	12.8	12.5	12.2	12.0	11.8
27.5	6.9	15.7	14.4	14.0	13.6	13.2	12.9	12.6	12.4	12.1
28.0	7.0	16.2	14.9	14.4	14.0	13.6	13.3	13.0	12.8	12.6
28.5	7.1	16.8	15.4	14.9	14.5	14.1	13.8	13.5	13.2	13.0
29.0	7.3	17.3	15.8	15.3	14.9	14.5	14.2	13.9	13.6	13.4
29.5	7.4	17.8	16.3	15.8	15.4	15.0	14.6	14.3	14.0	13.8
30.0	7.5	18.4	16.8	16.3	15.8	15.4	15.1	14.8	14.5	14.2
30.5	7.6	18.9	17.3	16.8	16.3	15.9	15.5	15.2	14.9	14.7
31.0	7.8	19.5	17.9	17.3	16.8	16.4	16.0	15.7	15.4	15.1
31.5	7.9	20.0	18.4	17.8	17.3	16.9	16.5	16.1	15.8	15.5
32.0	8.0	20.6	18.9	18.3	17.8	17.3	16.9	16.6	16.3	16.0
32.5	8.1	21.2	19.4	18.8	18.3	17.8	17.4	17.1	16.7	16.4

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1¼" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
19.0	4.8	6.1	6.0	5.9	5.8	5.8	5.7	5.6	5.6
19.5	4.9	6.4	6.3	6.2	6.1	6.0	6.0	5.9	5.8
20.0	5.0	6.7	6.6	6.5	6.4	6.3	6.3	6.2	6.1
20.5	5.1	7.0	6.9	6.8	6.7	6.6	6.5	6.5	6.4
21.0	5.3	7.3	7.2	7.1	7.0	6.9	6.8	6.8	6.7
21.5	5.4	7.7	7.5	7.4	7.3	7.2	7.1	7.0	7.0
22.0	5.5	8.0	7.9	7.7	7.6	7.5	7.4	7.4	7.3
22.5	5.6	8.3	8.2	8.1	7.9	7.8	7.7	7.7	7.6
23.0	5.8	8.6	8.5	8.4	8.3	8.2	8.1	8.0	7.9
23.5	5.9	9.0	8.8	8.7	8.6	8.5	8.4	8.3	8.2
24.0	6.0	9.3	9.2	9.1	8.9	8.8	8.7	8.6	8.5
24.5	6.1	9.7	9.5	9.4	9.3	9.1	9.0	8.9	8.8
25.0	6.3	10.1	9.9	9.7	9.6	9.5	9.4	9.3	9.2
25.5	6.4	10.4	10.3	10.1	10.0	9.8	9.7	9.6	9.5
26.0	6.5	10.8	10.6	10.5	10.3	10.2	10.1	10.0	9.9
26.5	6.6	11.2	11.0	10.8	10.7	10.6	10.4	10.3	10.2
27.0	6.8	11.6	11.4	11.2	11.1	10.9	10.8	10.7	10.6
27.5	6.9	11.9	11.8	11.6	11.4	11.3	11.2	11.0	10.9
28.0	7.0	12.3	12.2	12.0	11.8	11.7	11.5	11.4	11.3
28.5	7.1	12.7	12.5	12.4	12.2	12.0	11.9	11.8	11.7
29.0	7.3	13.2	13.0	12.8	12.6	12.4	12.3	12.2	12.0
29.5	7.4	13.6	13.4	13.2	13.0	12.8	12.7	12.5	12.4
30.0	7.5	14.0	13.8	13.6	13.4	13.2	13.1	12.9	12.8
30.5	7.6	14.4	14.2	14.0	13.8	13.6	13.5	13.3	13.2
31.0	7.8	14.8	14.6	14.4	14.2	14.0	13.9	13.7	13.6
31.5	7.9	15.3	15.0	14.8	14.6	14.5	14.3	14.1	14.0
32.0	8.0	15.7	15.5	15.3	15.1	14.9	14.7	14.6	14.4
32.5	8.1	16.2	15.9	15.7	15.5	15.3	15.1	15.0	14.8

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
5.0	0.9	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
6.0	1.1	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
7.0	1.3	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
8.0	1.5	0.8	0.8	0.7	0.7	0.7	0.7	0.6	0.6	0.6
9.0	1.6	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8
10.0	1.8	1.2	1.1	1.1	1.0	1.0	1.0	1.0	0.9	0.9
11.0	2.0	1.5	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1
12.0	2.2	1.7	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3
13.0	2.4	2.0	1.8	1.7	1.7	1.6	1.6	1.5	1.5	1.5
14.0	2.5	2.2	2.0	2.0	1.9	1.8	1.8	1.7	1.7	1.7
15.0	2.7	2.5	2.3	2.2	2.1	2.1	2.0	2.0	1.9	1.9
16.0	2.9	2.8	2.6	2.5	2.4	2.3	2.3	2.2	2.2	2.1
17.0	3.1	3.1	2.9	2.8	2.7	2.6	2.5	2.5	2.4	2.4
18.0	3.3	3.5	3.2	3.0	3.0	2.9	2.8	2.7	2.7	2.6
19.0	3.4	3.8	3.5	3.4	3.3	3.2	3.1	3.0	2.9	2.9
20.0	3.6	4.2	3.8	3.7	3.6	3.5	3.4	3.3	3.2	3.2
21.0	3.8	4.5	4.1	4.0	3.9	3.8	3.7	3.6	3.5	3.5
22.0	4.0	4.9	4.5	4.4	4.2	4.1	4.0	3.9	3.8	3.8
23.0	4.2	5.3	4.9	4.7	4.6	4.4	4.3	4.2	4.1	4.1
24.0	4.4	5.8	5.3	5.1	4.9	4.8	4.7	4.6	4.5	4.4

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
5.0	0.9	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
6.0	1.1	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3
7.0	1.3	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4
8.0	1.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5
9.0	1.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
10.0	1.8	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
11.0	2.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
12.0	2.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1
13.0	2.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3
14.0	2.5	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5
15.0	2.7	1.9	1.8	1.8	1.8	1.7	1.7	1.7	1.7
16.0	2.9	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9
17.0	3.1	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1
18.0	3.3	2.6	2.5	2.5	2.5	2.4	2.4	2.4	2.3
19.0	3.4	2.8	2.8	2.7	2.7	2.7	2.6	2.6	2.6
20.0	3.6	3.1	3.1	3.0	3.0	2.9	2.9	2.9	2.8
21.0	3.8	3.4	3.3	3.3	3.2	3.2	3.2	3.1	3.1
22.0	4.0	3.7	3.6	3.6	3.5	3.5	3.4	3.4	3.4
23.0	4.2	4.0	3.9	3.9	3.8	3.8	3.7	3.7	3.6
24.0	4.4	4.3	4.2	4.2	4.1	4.1	4.0	4.0	3.9

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
25.0	4.5	6.2	5.6	5.5	5.3	5.2	5.0	4.9	4.8	4.7
26.0	4.7	6.6	6.1	5.9	5.7	5.5	5.4	5.3	5.2	5.1
27.0	4.9	7.1	6.5	6.3	6.1	5.9	5.8	5.6	5.5	5.4
28.0	5.1	7.6	6.9	6.7	6.5	6.3	6.2	6.0	5.9	5.8
29.0	5.3	8.0	7.4	7.1	6.9	6.7	6.6	6.4	6.3	6.2
30.0	5.4	8.5	7.8	7.6	7.3	7.2	7.0	6.8	6.7	6.6
31.0	5.6	9.1	8.3	8.0	7.8	7.6	7.4	7.2	7.1	7.0
32.0	5.8	9.6	8.8	8.5	8.2	8.0	7.8	7.7	7.5	7.4
33.0	6.0	10.1	9.3	9.0	8.7	8.5	8.3	8.1	7.9	7.8
34.0	6.2	10.7	9.8	9.5	9.2	9.0	8.7	8.6	8.4	8.2
35.0	6.4	11.2	10.3	10.0	9.7	9.4	9.2	9.0	8.8	8.7
36.0	6.5	11.8	10.8	10.5	10.2	9.9	9.7	9.5	9.3	9.1
37.0	6.7	12.4	11.4	11.0	10.7	10.4	10.2	10.0	9.8	9.6
38.0	6.9	13.0	11.9	11.5	11.2	10.9	10.7	10.5	10.3	10.1
39.0	7.1	13.6	12.5	12.1	11.8	11.5	11.2	11.0	10.7	10.6
40.0	7.3	14.2	13.1	12.7	12.3	12.0	11.7	11.5	11.2	11.0
41.0	7.4	14.9	13.7	13.2	12.9	12.5	12.2	12.0	11.8	11.6
42.0	7.6	15.5	14.3	13.8	13.4	13.1	12.8	12.5	12.3	12.1
43.0	7.8	16.2	14.9	14.4	14.0	13.7	13.3	13.1	12.8	12.6
44.0	8.0	16.9	15.5	15.0	14.6	14.2	13.9	13.6	13.4	13.1
45.0	8.2	17.6	16.1	15.6	15.2	14.8	14.5	14.2	13.9	13.7
46.0	8.4	18.3	16.8	16.3	15.8	15.4	15.1	14.8	14.5	14.2
47.0	8.5	19.0	17.4	16.9	16.4	16.0	15.7	15.4	15.1	14.8
48.0	8.7	19.7	18.1	17.6	17.1	16.7	16.3	16.0	15.7	15.4
49.0	8.9	20.4	18.8	18.2	17.7	17.3	16.9	16.6	16.3	16.0
50.0	9.1	21.2	19.5	18.9	18.4	17.9	17.5	17.2	16.9	16.6
51.0	9.3	21.9	20.2	19.6	19.1	18.6	18.2	17.8	17.5	17.2
52.0	9.4	22.7	20.9	20.3	19.7	19.3	18.8	18.4	18.1	17.8
53.0	9.6	23.5	21.6	21.0	20.4	19.9	19.5	19.1	18.7	18.4
54.0	9.8	24.3	22.4	21.7	21.1	20.6	20.2	19.8	19.4	19.1
55.0	10.0	25.1	23.1	22.4	21.8	21.3	20.8	20.4	20.0	19.7

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

1½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
25.0	4.5	4.6	4.6	4.5	4.4	4.4	4.3	4.3	4.2
26.0	4.7	5.0	4.9	4.8	4.8	4.7	4.6	4.6	4.5
27.0	4.9	5.3	5.3	5.2	5.1	5.0	5.0	4.9	4.9
28.0	5.1	5.7	5.6	5.5	5.4	5.4	5.3	5.2	5.2
29.0	5.3	6.1	6.0	5.9	5.8	5.7	5.7	5.6	5.5
30.0	5.4	6.5	6.4	6.3	6.2	6.1	6.0	6.0	5.9
31.0	5.6	6.8	6.7	6.6	6.6	6.5	6.4	6.3	6.3
32.0	5.8	7.3	7.1	7.0	6.9	6.8	6.8	6.7	6.6
33.0	6.0	7.7	7.5	7.4	7.3	7.2	7.2	7.1	7.0
34.0	6.2	8.1	8.0	7.9	7.7	7.6	7.6	7.5	7.4
35.0	6.4	8.5	8.4	8.3	8.2	8.1	8.0	7.9	7.8
36.0	6.5	9.0	8.8	8.7	8.6	8.5	8.4	8.3	8.2
37.0	6.7	9.4	9.3	9.2	9.0	8.9	8.8	8.7	8.6
38.0	6.9	9.9	9.8	9.6	9.5	9.4	9.3	9.2	9.1
39.0	7.1	10.4	10.2	10.1	9.9	9.8	9.7	9.6	9.5
40.0	7.3	10.9	10.7	10.6	10.4	10.3	10.2	10.1	10.0
41.0	7.4	11.4	11.2	11.0	10.9	10.8	10.6	10.5	10.4
42.0	7.6	11.9	11.7	11.5	11.4	11.2	11.1	11.0	10.9
43.0	7.8	12.4	12.2	12.0	11.9	11.7	11.6	11.5	11.4
44.0	8.0	12.9	12.7	12.6	12.4	12.2	12.1	12.0	11.9
45.0	8.2	13.5	13.3	13.1	12.9	12.8	12.6	12.5	12.4
46.0	8.4	14.0	13.8	13.6	13.4	13.3	13.1	13.0	12.9
47.0	8.5	14.6	14.4	14.2	14.0	13.8	13.7	13.5	13.4
48.0	8.7	15.1	14.9	14.7	14.5	14.3	14.2	14.0	13.9
49.0	8.9	15.7	15.5	15.3	15.1	14.9	14.7	14.6	14.4
50.0	9.1	16.3	16.1	15.9	15.7	15.5	15.3	15.1	15.0
51.0	9.3	16.9	16.7	16.4	16.2	16.0	15.9	15.7	15.5
52.0	9.4	17.5	17.3	17.0	16.8	16.6	16.4	16.3	16.1
53.0	9.6	18.1	17.9	17.6	17.4	17.2	17.0	16.8	16.7
54.0	9.8	18.8	18.5	18.2	18.0	17.8	17.6	17.4	17.3
55.0	10.0	19.4	19.1	18.9	18.6	18.4	18.2	18.0	17.9

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

2" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
8.0	0.9	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
9.5	1.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2
11.0	1.2	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3
12.5	1.4	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
14.0	1.5	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
15.5	1.7	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
17.0	1.8	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
18.5	2.0	1.1	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8
20.0	2.2	1.2	1.1	1.1	1.0	1.0	1.0	1.0	0.9	0.9
21.5	2.3	1.4	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1
23.0	2.5	1.6	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2
24.5	2.7	1.8	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.3
26.0	2.8	2.0	1.8	1.7	1.7	1.6	1.6	1.5	1.5	1.5
27.5	3.0	2.2	2.0	1.9	1.8	1.8	1.7	1.7	1.7	1.6
29.0	3.2	2.4	2.2	2.1	2.0	2.0	1.9	1.9	1.8	1.8
30.5	3.3	2.6	2.4	2.3	2.2	2.1	2.1	2.0	2.0	2.0
32.0	3.5	2.8	2.6	2.5	2.4	2.3	2.3	2.2	2.2	2.1
33.5	3.6	3.0	2.8	2.7	2.6	2.5	2.5	2.4	2.4	2.3
35.0	3.8	3.3	3.0	2.9	2.8	2.7	2.7	2.6	2.6	2.5
36.5	4.0	3.5	3.2	3.1	3.0	3.0	2.9	2.8	2.8	2.7
38.0	4.1	3.8	3.5	3.4	3.3	3.2	3.1	3.0	3.0	2.9
39.5	4.3	4.1	3.7	3.6	3.5	3.4	3.3	3.3	3.2	3.1
41.0	4.5	4.4	4.0	3.9	3.7	3.6	3.6	3.5	3.4	3.4
42.5	4.6	4.6	4.3	4.1	4.0	3.9	3.8	3.7	3.6	3.6
44.0	4.8	4.9	4.5	4.4	4.3	4.1	4.0	4.0	3.9	3.8
45.5	4.9	5.2	4.8	4.6	4.5	4.4	4.3	4.2	4.1	4.0
47.0	5.1	5.6	5.1	4.9	4.8	4.7	4.6	4.5	4.4	4.3
48.5	5.3	5.9	5.4	5.2	5.1	4.9	4.8	4.7	4.6	4.5
50.0	5.4	6.2	5.7	5.5	5.3	5.2	5.1	5.0	4.9	4.8
51.5	5.6	6.5	6.0	5.8	5.6	5.5	5.4	5.3	5.2	5.1
53.0	5.8	6.9	6.3	6.1	5.9	5.8	5.7	5.5	5.4	5.3
54.5	5.9	7.2	6.6	6.4	6.2	6.1	5.9	5.8	5.7	5.6

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

2" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
8.0	0.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
9.5	1.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
11.0	1.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
12.5	1.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
14.0	1.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4
15.5	1.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
17.0	1.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
18.5	2.0	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
20.0	2.2	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8
21.5	2.3	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9
23.0	2.5	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1
24.5	2.7	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2
26.0	2.8	1.5	1.4	1.4	1.4	1.4	1.3	1.3	1.3
27.5	3.0	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.5
29.0	3.2	1.8	1.7	1.7	1.7	1.7	1.6	1.6	1.6
30.5	3.3	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8
32.0	3.5	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9
33.5	3.6	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1
35.0	3.8	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.3
36.5	4.0	2.7	2.6	2.6	2.6	2.5	2.5	2.5	2.4
38.0	4.1	2.9	2.8	2.8	2.7	2.7	2.7	2.6	2.6
39.5	4.3	3.1	3.0	3.0	2.9	2.9	2.9	2.8	2.8
41.0	4.5	3.3	3.2	3.2	3.1	3.1	3.1	3.0	3.0
42.5	4.6	3.5	3.5	3.4	3.4	3.3	3.3	3.2	3.2
44.0	4.8	3.7	3.7	3.6	3.6	3.5	3.5	3.5	3.4
45.5	4.9	4.0	3.9	3.9	3.8	3.8	3.7	3.7	3.6
47.0	5.1	4.2	4.1	4.1	4.0	4.0	3.9	3.9	3.8
48.5	5.3	4.5	4.4	4.3	4.3	4.2	4.2	4.1	4.1
50.0	5.4	4.7	4.6	4.6	4.5	4.5	4.4	4.4	4.3
51.5	5.6	5.0	4.9	4.8	4.8	4.7	4.6	4.6	4.5
53.0	5.8	5.2	5.2	5.1	5.0	5.0	4.9	4.8	4.8
54.5	5.9	5.5	5.4	5.3	5.3	5.2	5.2	5.1	5.0

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

2" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
56.0	6.1	7.6	7.0	6.7	6.6	6.4	6.2	6.1	6.0	5.9
57.5	6.2	7.9	7.3	7.1	6.9	6.7	6.5	6.4	6.3	6.2
59.0	6.4	8.3	7.6	7.4	7.2	7.0	6.9	6.7	6.6	6.5
60.5	6.6	8.7	8.0	7.7	7.5	7.3	7.2	7.0	6.9	6.8
62.0	6.7	9.1	8.4	8.1	7.9	7.7	7.5	7.3	7.2	7.1
63.5	6.9	9.5	8.7	8.5	8.2	8.0	7.8	7.7	7.5	7.4
65.0	7.1	9.9	9.1	8.8	8.6	8.4	8.2	8.0	7.9	7.7
66.5	7.2	10.3	9.5	9.2	8.9	8.7	8.5	8.3	8.2	8.0
68.0	7.4	10.7	9.9	9.6	9.3	9.1	8.9	8.7	8.5	8.4
69.5	7.6	11.1	10.3	9.9	9.7	9.4	9.2	9.0	8.9	8.7
71.0	7.7	11.6	10.7	10.3	10.1	9.8	9.6	9.4	9.2	9.1
72.5	7.9	12.0	11.1	10.7	10.4	10.2	10.0	9.8	9.6	9.4
74.0	8.0	12.5	11.5	11.1	10.8	10.6	10.3	10.1	9.9	9.8
75.5	8.2	12.9	11.9	11.5	11.2	11.0	10.7	10.5	10.3	10.1
77.0	8.4	13.4	12.3	12.0	11.6	11.4	11.1	10.9	10.7	10.5
78.5	8.5	13.9	12.8	12.4	12.0	11.8	11.5	11.3	11.1	10.9
80.0	8.7	14.3	13.2	12.8	12.5	12.2	11.9	11.7	11.4	11.3
81.5	8.9	14.8	13.6	13.2	12.9	12.6	12.3	12.1	11.8	11.6
83.0	9.0	15.3	14.1	13.7	13.3	13.0	12.7	12.5	12.2	12.0
84.5	9.2	15.8	14.6	14.1	13.8	13.4	13.1	12.9	12.6	12.4
86.0	9.3	16.3	15.0	14.6	14.2	13.9	13.6	13.3	13.1	12.8
87.5	9.5	16.8	15.5	15.1	14.7	14.3	14.0	13.7	13.5	13.3
89.0	9.7	17.3	16.0	15.5	15.1	14.8	14.4	14.2	13.9	13.7
90.5	9.8	17.9	16.5	16.0	15.6	15.2	14.9	14.6	14.3	14.1
92.0	10.0	18.4	17.0	16.5	16.1	15.7	15.3	15.0	14.8	14.5

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

2" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
56.0	6.1	5.8	5.7	5.6	5.5	5.5	5.4	5.4	5.3
57.5	6.2	6.1	6.0	5.9	5.8	5.7	5.7	5.6	5.6
59.0	6.4	6.4	6.3	6.2	6.1	6.0	6.0	5.9	5.8
60.5	6.6	6.7	6.6	6.5	6.4	6.3	6.2	6.2	6.1
62.0	6.7	7.0	6.9	6.8	6.7	6.6	6.5	6.5	6.4
63.5	6.9	7.3	7.2	7.1	7.0	6.9	6.8	6.7	6.7
65.0	7.1	7.6	7.5	7.4	7.3	7.2	7.1	7.0	7.0
66.5	7.2	7.9	7.8	7.7	7.6	7.5	7.4	7.3	7.3
68.0	7.4	8.2	8.1	8.0	7.9	7.8	7.7	7.6	7.6
69.5	7.6	8.6	8.4	8.3	8.2	8.1	8.0	8.0	7.9
71.0	7.7	8.9	8.8	8.7	8.6	8.4	8.4	8.3	8.2
72.5	7.9	9.3	9.1	9.0	8.9	8.8	8.7	8.6	8.5
74.0	8.0	9.6	9.5	9.3	9.2	9.1	9.0	8.9	8.8
75.5	8.2	10.0	9.8	9.7	9.6	9.5	9.4	9.3	9.2
77.0	8.4	10.3	10.2	10.0	9.9	9.8	9.7	9.6	9.5
78.5	8.5	10.7	10.5	10.4	10.3	10.2	10.0	9.9	9.8
80.0	8.7	11.1	10.9	10.8	10.6	10.5	10.4	10.3	10.2
81.5	8.9	11.5	11.3	11.1	11.0	10.9	10.8	10.7	10.5
83.0	9.0	11.8	11.7	11.5	11.4	11.2	11.1	11.0	10.9
84.5	9.2	12.2	12.1	11.9	11.8	11.6	11.5	11.4	11.3
86.0	9.3	12.6	12.5	12.3	12.1	12.0	11.9	11.8	11.6
87.5	9.5	13.0	12.9	12.7	12.5	12.4	12.3	12.1	12.0
89.0	9.7	13.5	13.3	13.1	12.9	12.8	12.6	12.5	12.4
90.5	9.8	13.9	13.7	13.5	13.3	13.2	13.0	12.9	12.8
92.0	10.0	14.3	14.1	13.9	13.7	13.6	13.4	13.3	13.2

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

2½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
10.0	0.8	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
12.0	0.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
14.0	1.1	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
16.0	1.2	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
18.0	1.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3
20.0	1.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4
22.0	1.7	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
24.0	1.8	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.5
26.0	2.0	0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6
28.0	2.1	0.9	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7
30.0	2.3	1.1	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8
32.0	2.4	1.2	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9
34.0	2.6	1.3	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0
36.0	2.7	1.5	1.3	1.3	1.3	1.2	1.2	1.2	1.1	1.1
38.0	2.9	1.6	1.5	1.4	1.4	1.3	1.3	1.3	1.2	1.2
40.0	3.0	1.8	1.6	1.6	1.5	1.5	1.4	1.4	1.4	1.3
42.0	3.2	1.9	1.8	1.7	1.6	1.6	1.6	1.5	1.5	1.5
44.0	3.3	2.1	1.9	1.8	1.8	1.7	1.7	1.7	1.6	1.6
46.0	3.5	2.3	2.1	2.0	1.9	1.9	1.8	1.8	1.8	1.7
48.0	3.6	2.4	2.2	2.2	2.1	2.0	2.0	1.9	1.9	1.9
50.0	3.8	2.6	2.4	2.3	2.2	2.2	2.1	2.1	2.0	2.0
52.0	3.9	2.8	2.6	2.5	2.4	2.3	2.3	2.2	2.2	2.2
54.0	4.1	3.0	2.7	2.7	2.6	2.5	2.5	2.4	2.4	2.3
56.0	4.2	3.2	2.9	2.8	2.8	2.7	2.6	2.6	2.5	2.5
58.0	4.4	3.4	3.1	3.0	2.9	2.9	2.8	2.7	2.7	2.6
60.0	4.5	3.6	3.3	3.2	3.1	3.0	3.0	2.9	2.8	2.8
62.0	4.7	3.8	3.5	3.4	3.3	3.2	3.1	3.1	3.0	3.0
64.0	4.8	4.1	3.7	3.6	3.5	3.4	3.3	3.3	3.2	3.1
66.0	5.0	4.3	3.9	3.8	3.7	3.6	3.5	3.4	3.4	3.3
68.0	5.1	4.5	4.1	4.0	3.9	3.8	3.7	3.6	3.6	3.5
70.0	5.3	4.8	4.4	4.2	4.1	4.0	3.9	3.8	3.8	3.7
72.0	5.5	5.0	4.6	4.4	4.3	4.2	4.1	4.0	4.0	3.9

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

2½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
10.0	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
12.0	0.9	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
14.0	1.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
16.0	1.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
18.0	1.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
20.0	1.5	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3
22.0	1.7	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
24.0	1.8	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
26.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
28.0	2.1	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6
30.0	2.3	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
32.0	2.4	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8
34.0	2.6	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
36.0	2.7	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0
38.0	2.9	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1
40.0	3.0	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2
42.0	3.2	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3
44.0	3.3	1.6	1.5	1.5	1.5	1.5	1.5	1.4	1.4
46.0	3.5	1.7	1.7	1.6	1.6	1.6	1.6	1.6	1.5
48.0	3.6	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.7
50.0	3.8	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8
52.0	3.9	2.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9
54.0	4.1	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1
56.0	4.2	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2
58.0	4.4	2.6	2.5	2.5	2.5	2.4	2.4	2.4	2.4
60.0	4.5	2.7	2.7	2.7	2.6	2.6	2.6	2.5	2.5
62.0	4.7	2.9	2.9	2.8	2.8	2.8	2.7	2.7	2.7
64.0	4.8	3.1	3.0	3.0	3.0	2.9	2.9	2.8	2.8
66.0	5.0	3.3	3.2	3.2	3.1	3.1	3.0	3.0	3.0
68.0	5.1	3.4	3.4	3.3	3.3	3.3	3.2	3.2	3.1
70.0	5.3	3.6	3.6	3.5	3.5	3.4	3.4	3.4	3.3
72.0	5.5	3.8	3.8	3.7	3.7	3.6	3.6	3.5	3.5

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

2½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
74.0	5.6	5.2	4.8	4.7	4.5	4.4	4.3	4.2	4.2	4.1
76.0	5.8	5.5	5.1	4.9	4.8	4.6	4.5	4.4	4.4	4.3
78.0	5.9	5.8	5.3	5.1	5.0	4.9	4.8	4.7	4.6	4.5
80.0	6.1	6.0	5.5	5.4	5.2	5.1	5.0	4.9	4.8	4.7
82.0	6.2	6.3	5.8	5.6	5.5	5.3	5.2	5.1	5.0	4.9
84.0	6.4	6.6	6.0	5.9	5.7	5.6	5.4	5.3	5.2	5.1
86.0	6.5	6.9	6.3	6.1	6.0	5.8	5.7	5.6	5.5	5.4
88.0	6.7	7.1	6.6	6.4	6.2	6.0	5.9	5.8	5.7	5.6
90.0	6.8	7.4	6.8	6.6	6.5	6.3	6.2	6.0	5.9	5.8
92.0	7.0	7.7	7.1	6.9	6.7	6.6	6.4	6.3	6.2	6.1
94.0	7.1	8.0	7.4	7.2	7.0	6.8	6.7	6.5	6.4	6.3
96.0	7.3	8.3	7.7	7.5	7.3	7.1	6.9	6.8	6.7	6.5
98.0	7.4	8.7	8.0	7.7	7.5	7.3	7.2	7.0	6.9	6.8
100.0	7.6	9.0	8.3	8.0	7.8	7.6	7.5	7.3	7.2	7.0
102.0	7.7	9.3	8.6	8.3	8.1	7.9	7.7	7.6	7.4	7.3
104.0	7.9	9.6	8.9	8.6	8.4	8.2	8.0	7.8	7.7	7.6
106.0	8.0	10.0	9.2	8.9	8.7	8.5	8.3	8.1	8.0	7.8
108.0	8.2	10.3	9.5	9.2	9.0	8.8	8.6	8.4	8.2	8.1
110.0	8.3	10.7	9.8	9.5	9.3	9.1	8.9	8.7	8.5	8.4
112.0	8.5	11.0	10.1	9.8	9.6	9.4	9.2	9.0	8.8	8.7
114.0	8.6	11.4	10.5	10.2	9.9	9.7	9.5	9.3	9.1	9.0
116.0	8.8	11.7	10.8	10.5	10.2	10.0	9.8	9.6	9.4	9.2
118.0	8.9	12.1	11.1	10.8	10.5	10.3	10.1	9.9	9.7	9.5
120.0	9.1	12.4	11.5	11.2	10.9	10.6	10.4	10.2	10.0	9.8
122.0	9.2	12.8	11.8	11.5	11.2	10.9	10.7	10.5	10.3	10.1
124.0	9.4	13.2	12.2	11.8	11.5	11.3	11.0	10.8	10.6	10.4
126.0	9.5	13.6	12.5	12.2	11.9	11.6	11.3	11.1	10.9	10.7
128.0	9.7	14.0	12.9	12.5	12.2	11.9	11.7	11.4	11.2	11.1

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

2½" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
74.0	5.6	4.0	4.0	3.9	3.8	3.8	3.8	3.7	3.7
76.0	5.8	4.2	4.1	4.1	4.0	4.0	3.9	3.9	3.9
78.0	5.9	4.4	4.3	4.3	4.2	4.2	4.1	4.1	4.0
80.0	6.1	4.6	4.6	4.5	4.4	4.4	4.3	4.3	4.2
82.0	6.2	4.8	4.8	4.7	4.6	4.6	4.5	4.5	4.4
84.0	6.4	5.1	5.0	4.9	4.8	4.8	4.7	4.7	4.6
86.0	6.5	5.3	5.2	5.1	5.1	5.0	4.9	4.9	4.8
88.0	6.7	5.5	5.4	5.3	5.3	5.2	5.1	5.1	5.0
90.0	6.8	5.7	5.6	5.6	5.5	5.4	5.4	5.3	5.3
92.0	7.0	6.0	5.9	5.8	5.7	5.6	5.6	5.5	5.5
94.0	7.1	6.2	6.1	6.0	5.9	5.9	5.8	5.8	5.7
96.0	7.3	6.4	6.3	6.3	6.2	6.1	6.0	6.0	5.9
98.0	7.4	6.7	6.6	6.5	6.4	6.3	6.3	6.2	6.1
100.0	7.6	6.9	6.8	6.7	6.7	6.6	6.5	6.4	6.4
102.0	7.7	7.2	7.1	7.0	6.9	6.8	6.7	6.7	6.6
104.0	7.9	7.5	7.3	7.2	7.2	7.1	7.0	6.9	6.9
106.0	8.0	7.7	7.6	7.5	7.4	7.3	7.2	7.2	7.1
108.0	8.2	8.0	7.9	7.8	7.7	7.6	7.5	7.4	7.3
110.0	8.3	8.3	8.1	8.0	7.9	7.8	7.8	7.7	7.6
112.0	8.5	8.5	8.4	8.3	8.2	8.1	8.0	7.9	7.9
114.0	8.6	8.8	8.7	8.6	8.5	8.4	8.3	8.2	8.1
116.0	8.8	9.1	9.0	8.8	8.7	8.6	8.5	8.5	8.4
118.0	8.9	9.4	9.3	9.1	9.0	8.9	8.8	8.7	8.6
120.0	9.1	9.7	9.5	9.4	9.3	9.2	9.1	9.0	8.9
122.0	9.2	10.0	9.8	9.7	9.6	9.5	9.4	9.3	9.2
124.0	9.4	10.3	10.1	10.0	9.9	9.8	9.7	9.6	9.5
126.0	9.5	10.6	10.4	10.3	10.2	10.1	10.0	9.9	9.8
128.0	9.7	10.9	10.7	10.6	10.5	10.4	10.2	10.1	10.0

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

3" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
15.0	0.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
18.0	0.9	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
21.0	1.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
24.0	1.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
27.0	1.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
30.0	1.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
33.0	1.6	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
36.0	1.7	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
39.0	1.9	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4
42.0	2.0	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5
45.0	2.2	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
48.0	2.3	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.6
51.0	2.5	0.9	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7
54.0	2.6	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
57.0	2.8	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9
60.0	2.9	1.3	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0
63.0	3.1	1.4	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.0
66.0	3.2	1.5	1.4	1.3	1.3	1.2	1.2	1.2	1.2	1.1
69.0	3.4	1.6	1.5	1.4	1.4	1.3	1.3	1.3	1.3	1.2
72.0	3.5	1.7	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.3
75.0	3.6	1.9	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.4
78.0	3.8	2.0	1.8	1.8	1.7	1.7	1.6	1.6	1.6	1.5
81.0	3.9	2.1	2.0	1.9	1.8	1.8	1.8	1.7	1.7	1.6
84.0	4.1	2.3	2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.8
87.0	4.2	2.4	2.2	2.2	2.1	2.0	2.0	1.9	1.9	1.9
90.0	4.4	2.6	2.4	2.3	2.2	2.2	2.1	2.1	2.0	2.0
93.0	4.5	2.7	2.5	2.4	2.4	2.3	2.2	2.2	2.2	2.1
96.0	4.7	2.9	2.6	2.6	2.5	2.4	2.4	2.3	2.3	2.2
99.0	4.8	3.0	2.8	2.7	2.6	2.6	2.5	2.5	2.4	2.4
102.0	5.0	3.2	3.0	2.9	2.8	2.7	2.7	2.6	2.5	2.5

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

3" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
15.0	0.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
18.0	0.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
21.0	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
24.0	1.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
27.0	1.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
30.0	1.5	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
33.0	1.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
36.0	1.7	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
39.0	1.9	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
42.0	2.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4
45.0	2.2	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
48.0	2.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
51.0	2.5	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6
54.0	2.6	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7
57.0	2.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8
60.0	2.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
63.0	3.1	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9
66.0	3.2	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0
69.0	3.4	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1
72.0	3.5	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2
75.0	3.6	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3
78.0	3.8	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.4
81.0	3.9	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5
84.0	4.1	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6
87.0	4.2	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.7
90.0	4.4	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8
93.0	4.5	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9
96.0	4.7	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0
99.0	4.8	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1
102.0	5.0	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.3

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

3" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
105.0	5.1	3.4	3.1	3.0	2.9	2.9	2.8	2.7	2.7	2.6
108.0	5.2	3.6	3.3	3.2	3.1	3.0	2.9	2.9	2.8	2.8
111.0	5.4	3.7	3.4	3.3	3.2	3.2	3.1	3.0	3.0	2.9
114.0	5.5	3.9	3.6	3.5	3.4	3.3	3.2	3.2	3.1	3.1
117.0	5.7	4.1	3.8	3.7	3.6	3.5	3.4	3.3	3.3	3.2
120.0	5.8	4.3	4.0	3.8	3.7	3.6	3.6	3.5	3.4	3.4
123.0	6.0	4.5	4.1	4.0	3.9	3.8	3.7	3.6	3.6	3.5
126.0	6.1	4.7	4.3	4.2	4.1	4.0	3.9	3.8	3.7	3.7
129.0	6.3	4.9	4.5	4.4	4.3	4.1	4.1	4.0	3.9	3.8
132.0	6.4	5.1	4.7	4.6	4.4	4.3	4.2	4.1	4.1	4.0
135.0	6.6	5.3	4.9	4.7	4.6	4.5	4.4	4.3	4.2	4.2
138.0	6.7	5.5	5.1	4.9	4.8	4.7	4.6	4.5	4.4	4.3
141.0	6.8	5.7	5.3	5.1	5.0	4.9	4.8	4.7	4.6	4.5
144.0	7.0	6.0	5.5	5.3	5.2	5.1	5.0	4.9	4.8	4.7
147.0	7.1	6.2	5.7	5.5	5.4	5.3	5.1	5.0	4.9	4.9
150.0	7.3	6.4	5.9	5.7	5.6	5.4	5.3	5.2	5.1	5.0
153.0	7.4	6.6	6.1	5.9	5.8	5.6	5.5	5.4	5.3	5.2
156.0	7.6	6.9	6.3	6.2	6.0	5.9	5.7	5.6	5.5	5.4
159.0	7.7	7.1	6.6	6.4	6.2	6.1	5.9	5.8	5.7	5.6
162.0	7.9	7.4	6.8	6.6	6.4	6.3	6.1	6.0	5.9	5.8
165.0	8.0	7.6	7.0	6.8	6.6	6.5	6.3	6.2	6.1	6.0
168.0	8.2	7.8	7.2	7.0	6.9	6.7	6.6	6.4	6.3	6.2
171.0	8.3	8.1	7.5	7.3	7.1	6.9	6.8	6.6	6.5	6.4
174.0	8.5	8.4	7.7	7.5	7.3	7.1	7.0	6.8	6.7	6.6
177.0	8.6	8.6	8.0	7.7	7.5	7.4	7.2	7.1	6.9	6.8
180.0	8.7	8.9	8.2	8.0	7.8	7.6	7.4	7.3	7.2	7.0
183.0	8.9	9.2	8.5	8.2	8.0	7.8	7.7	7.5	7.4	7.3
186.0	9.0	9.4	8.7	8.5	8.2	8.1	7.9	7.7	7.6	7.5
189.0	9.2	9.7	9.0	8.7	8.5	8.3	8.1	8.0	7.8	7.7
192.0	9.3	10.0	9.2	9.0	8.7	8.5	8.4	8.2	8.0	7.9

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

3" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
105.0	5.1	2.6	2.6	2.5	2.5	2.5	2.4	2.4	2.4
108.0	5.2	2.7	2.7	2.7	2.6	2.6	2.6	2.5	2.5
111.0	5.4	2.9	2.8	2.8	2.8	2.7	2.7	2.7	2.6
114.0	5.5	3.0	3.0	2.9	2.9	2.9	2.8	2.8	2.8
117.0	5.7	3.2	3.1	3.1	3.0	3.0	3.0	2.9	2.9
120.0	5.8	3.3	3.3	3.2	3.2	3.1	3.1	3.1	3.0
123.0	6.0	3.5	3.4	3.4	3.3	3.3	3.2	3.2	3.2
126.0	6.1	3.6	3.6	3.5	3.5	3.4	3.4	3.4	3.3
129.0	6.3	3.8	3.7	3.7	3.6	3.6	3.5	3.5	3.5
132.0	6.4	3.9	3.9	3.8	3.8	3.7	3.7	3.6	3.6
135.0	6.6	4.1	4.0	4.0	3.9	3.9	3.8	3.8	3.8
138.0	6.7	4.3	4.2	4.1	4.1	4.0	4.0	4.0	3.9
141.0	6.8	4.4	4.4	4.3	4.3	4.2	4.2	4.1	4.1
144.0	7.0	4.6	4.5	4.5	4.4	4.4	4.3	4.3	4.2
147.0	7.1	4.8	4.7	4.7	4.6	4.5	4.5	4.4	4.4
150.0	7.3	5.0	4.9	4.8	4.8	4.7	4.7	4.6	4.6
153.0	7.4	5.1	5.1	5.0	4.9	4.9	4.8	4.8	4.7
156.0	7.6	5.3	5.3	5.2	5.1	5.1	5.0	5.0	4.9
159.0	7.7	5.5	5.4	5.4	5.3	5.2	5.2	5.1	5.1
162.0	7.9	5.7	5.6	5.6	5.5	5.4	5.4	5.3	5.3
165.0	8.0	5.9	5.8	5.7	5.7	5.6	5.6	5.5	5.4
168.0	8.2	6.1	6.0	5.9	5.9	5.8	5.7	5.7	5.6
171.0	8.3	6.3	6.2	6.1	6.1	6.0	5.9	5.9	5.8
174.0	8.5	6.5	6.4	6.3	6.3	6.2	6.1	6.1	6.0
177.0	8.6	6.7	6.6	6.5	6.5	6.4	6.3	6.3	6.2
180.0	8.7	6.9	6.8	6.7	6.7	6.6	6.5	6.5	6.4
183.0	8.9	7.1	7.0	7.0	6.9	6.8	6.7	6.7	6.6
186.0	9.0	7.4	7.3	7.2	7.1	7.0	6.9	6.9	6.8
189.0	9.2	7.6	7.5	7.4	7.3	7.2	7.1	7.1	7.0
192.0	9.3	7.8	7.7	7.6	7.5	7.4	7.3	7.3	7.2

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

4" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
25.0	0.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
30.0	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
35.0	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
40.0	1.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
45.0	1.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
50.0	1.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
55.0	1.5	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
60.0	1.7	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
65.0	1.8	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
70.0	2.0	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
75.0	2.1	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
80.0	2.2	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4
85.0	2.4	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
90.0	2.5	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5
95.0	2.7	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
100.0	2.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.6
105.0	2.9	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
110.0	3.1	1.0	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8
115.0	3.2	1.1	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8
120.0	3.3	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9
125.0	3.5	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0
130.0	3.6	1.3	1.2	1.2	1.1	1.1	1.1	1.1	1.0	1.0
135.0	3.8	1.4	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1
140.0	3.9	1.5	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2
145.0	4.0	1.6	1.5	1.4	1.4	1.3	1.3	1.3	1.3	1.2
150.0	4.2	1.7	1.6	1.5	1.5	1.4	1.4	1.4	1.3	1.3
155.0	4.3	1.8	1.7	1.6	1.6	1.5	1.5	1.5	1.4	1.4
160.0	4.5	1.9	1.8	1.7	1.7	1.6	1.6	1.5	1.5	1.5
165.0	4.6	2.0	1.9	1.8	1.7	1.7	1.7	1.6	1.6	1.6
170.0	4.7	2.1	2.0	1.9	1.8	1.8	1.8	1.7	1.7	1.7
175.0	4.9	2.2	2.1	2.0	1.9	1.9	1.9	1.8	1.8	1.8
180.0	5.0	2.3	2.2	2.1	2.0	2.0	1.9	1.9	1.9	1.8

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

4" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
25.0	0.7	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
30.0	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
35.0	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
40.0	1.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
45.0	1.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
50.0	1.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
55.0	1.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
60.0	1.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
65.0	1.8	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
70.0	2.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
75.0	2.1	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3
80.0	2.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
85.0	2.4	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
90.0	2.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
95.0	2.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
100.0	2.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
105.0	2.9	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6
110.0	3.1	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
115.0	3.2	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7
120.0	3.3	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8
125.0	3.5	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
130.0	3.6	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9
135.0	3.8	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0
140.0	3.9	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
145.0	4.0	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1
150.0	4.2	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2
155.0	4.3	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3
160.0	4.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.3
165.0	4.6	1.5	1.5	1.5	1.5	1.5	1.4	1.4	1.4
170.0	4.7	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5
175.0	4.9	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6
180.0	5.0	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.7

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

4" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
185.0	5.2	2.5	2.3	2.2	2.1	2.1	2.0	2.0	2.0	1.9
190.0	5.3	2.6	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.0
195.0	5.4	2.7	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.1
200.0	5.6	2.8	2.6	2.5	2.5	2.4	2.4	2.3	2.3	2.2
205.0	5.7	3.0	2.7	2.7	2.6	2.5	2.5	2.4	2.4	2.3
210.0	5.9	3.1	2.9	2.8	2.7	2.6	2.6	2.5	2.5	2.4
215.0	6.0	3.2	3.0	2.9	2.8	2.8	2.7	2.6	2.6	2.5
220.0	6.1	3.4	3.1	3.0	2.9	2.9	2.8	2.7	2.7	2.7
225.0	6.3	3.5	3.2	3.1	3.1	3.0	2.9	2.9	2.8	2.8
230.0	6.4	3.6	3.4	3.3	3.2	3.1	3.0	3.0	2.9	2.9
235.0	6.6	3.8	3.5	3.4	3.3	3.2	3.2	3.1	3.0	3.0
240.0	6.7	3.9	3.6	3.5	3.4	3.4	3.3	3.2	3.2	3.1
245.0	6.8	4.1	3.8	3.7	3.6	3.5	3.4	3.3	3.3	3.2
250.0	7.0	4.2	3.9	3.8	3.7	3.6	3.5	3.5	3.4	3.4
255.0	7.1	4.4	4.1	3.9	3.8	3.7	3.7	3.6	3.5	3.5
260.0	7.3	4.5	4.2	4.1	4.0	3.9	3.8	3.7	3.7	3.6
265.0	7.4	4.7	4.3	4.2	4.1	4.0	3.9	3.9	3.8	3.7
270.0	7.5	4.9	4.5	4.4	4.3	4.2	4.1	4.0	3.9	3.9
275.0	7.7	5.0	4.6	4.5	4.4	4.3	4.2	4.1	4.1	4.0
280.0	7.8	5.2	4.8	4.7	4.5	4.4	4.3	4.3	4.2	4.1
285.0	8.0	5.4	5.0	4.8	4.7	4.6	4.5	4.4	4.3	4.3
290.0	8.1	5.5	5.1	5.0	4.8	4.7	4.6	4.5	4.5	4.4
295.0	8.2	5.7	5.3	5.1	5.0	4.9	4.8	4.7	4.6	4.5
300.0	8.4	5.9	5.4	5.3	5.2	5.0	4.9	4.8	4.8	4.7
305.0	8.5	6.1	5.6	5.4	5.3	5.2	5.1	5.0	4.9	4.8
310.0	8.7	6.2	5.8	5.6	5.5	5.3	5.2	5.1	5.0	5.0
315.0	8.8	6.4	5.9	5.8	5.6	5.5	5.4	5.3	5.2	5.1
320.0	8.9	6.6	6.1	5.9	5.8	5.7	5.5	5.4	5.3	5.3

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

4" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
185.0	5.2	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.7
190.0	5.3	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8
195.0	5.4	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9
200.0	5.6	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0
205.0	5.7	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1
210.0	5.9	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2
215.0	6.0	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.3
220.0	6.1	2.6	2.6	2.5	2.5	2.5	2.5	2.4	2.4
225.0	6.3	2.7	2.7	2.6	2.6	2.6	2.6	2.5	2.5
230.0	6.4	2.8	2.8	2.8	2.7	2.7	2.7	2.6	2.6
235.0	6.6	2.9	2.9	2.9	2.8	2.8	2.8	2.7	2.7
240.0	6.7	3.1	3.0	3.0	2.9	2.9	2.9	2.8	2.8
245.0	6.8	3.2	3.1	3.1	3.1	3.0	3.0	3.0	2.9
250.0	7.0	3.3	3.3	3.2	3.2	3.1	3.1	3.1	3.0
255.0	7.1	3.4	3.4	3.3	3.3	3.2	3.2	3.2	3.2
260.0	7.3	3.5	3.5	3.4	3.4	3.4	3.3	3.3	3.3
265.0	7.4	3.7	3.6	3.6	3.5	3.5	3.5	3.4	3.4
270.0	7.5	3.8	3.7	3.7	3.7	3.6	3.6	3.5	3.5
275.0	7.7	3.9	3.9	3.8	3.8	3.7	3.7	3.7	3.6
280.0	7.8	4.1	4.0	4.0	3.9	3.9	3.8	3.8	3.7
285.0	8.0	4.2	4.1	4.1	4.0	4.0	3.9	3.9	3.9
290.0	8.1	4.3	4.3	4.2	4.2	4.1	4.1	4.0	4.0
295.0	8.2	4.5	4.4	4.3	4.3	4.2	4.2	4.2	4.1
300.0	8.4	4.6	4.5	4.5	4.4	4.4	4.3	4.3	4.3
305.0	8.5	4.7	4.7	4.6	4.6	4.5	4.5	4.4	4.4
310.0	8.7	4.9	4.8	4.8	4.7	4.7	4.6	4.6	4.5
315.0	8.8	5.0	5.0	4.9	4.8	4.8	4.7	4.7	4.7
320.0	8.9	5.2	5.1	5.0	5.0	4.9	4.9	4.8	4.8

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

6" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
75.0	0.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
85.0	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
95.0	1.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
105.0	1.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
115.0	1.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
125.0	1.5	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
135.0	1.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
145.0	1.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
155.0	1.9	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
165.0	2.0	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
175.0	2.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
185.0	2.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
195.0	2.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
205.0	2.5	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3
215.0	2.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
225.0	2.8	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
235.0	2.9	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4
245.0	3.0	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4
255.0	3.1	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
265.0	3.3	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5
275.0	3.4	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
285.0	3.5	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
295.0	3.6	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6
305.0	3.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
315.0	3.9	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
325.0	4.0	1.0	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.7
335.0	4.1	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
345.0	4.2	1.1	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.8
355.0	4.4	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
365.0	4.5	1.2	1.1	1.0	1.0	1.0	1.0	1.0	0.9	0.9
375.0	4.6	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0
385.0	4.7	1.3	1.2	1.2	1.1	1.1	1.1	1.1	1.0	1.0
395.0	4.9	1.4	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

6" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
75.0	0.9	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
85.0	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
95.0	1.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
105.0	1.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
115.0	1.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
125.0	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
135.0	1.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
145.0	1.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
155.0	1.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
165.0	2.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
175.0	2.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
185.0	2.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
195.0	2.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
205.0	2.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
215.0	2.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
225.0	2.8	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3
235.0	2.9	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
245.0	3.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
255.0	3.1	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4
265.0	3.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
275.0	3.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
285.0	3.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5
295.0	3.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
305.0	3.8	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6
315.0	3.9	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6
325.0	4.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
335.0	4.1	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7
345.0	4.2	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
355.0	4.4	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8
365.0	4.5	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8
375.0	4.6	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9
385.0	4.7	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9
395.0	4.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

6" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
405.0	5.0	1.4	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1
415.0	5.1	1.5	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2
425.0	5.2	1.5	1.4	1.4	1.3	1.3	1.3	1.3	1.2	1.2
435.0	5.4	1.6	1.5	1.4	1.4	1.4	1.3	1.3	1.3	1.3
445.0	5.5	1.7	1.5	1.5	1.5	1.4	1.4	1.4	1.3	1.3
455.0	5.6	1.7	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4
465.0	5.7	1.8	1.7	1.6	1.6	1.5	1.5	1.5	1.5	1.4
475.0	5.8	1.9	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.5
485.0	6.0	2.0	1.8	1.8	1.7	1.7	1.6	1.6	1.6	1.6
495.0	6.1	2.0	1.9	1.8	1.8	1.7	1.7	1.7	1.6	1.6
505.0	6.2	2.1	1.9	1.9	1.8	1.8	1.8	1.7	1.7	1.7
515.0	6.3	2.2	2.0	2.0	1.9	1.9	1.8	1.8	1.8	1.7
525.0	6.5	2.3	2.1	2.0	2.0	1.9	1.9	1.9	1.8	1.8
535.0	6.6	2.3	2.2	2.1	2.0	2.0	2.0	1.9	1.9	1.9
545.0	6.7	2.4	2.2	2.2	2.1	2.1	2.0	2.0	2.0	1.9
555.0	6.8	2.5	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0
565.0	7.0	2.6	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.1
575.0	7.1	2.7	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.1
585.0	7.2	2.7	2.5	2.5	2.4	2.4	2.3	2.3	2.2	2.2
595.0	7.3	2.8	2.6	2.5	2.5	2.4	2.4	2.3	2.3	2.3
605.0	7.4	2.9	2.7	2.6	2.6	2.5	2.4	2.4	2.4	2.3
615.0	7.6	3.0	2.8	2.7	2.6	2.6	2.5	2.5	2.4	2.4
625.0	7.7	3.1	2.9	2.8	2.7	2.7	2.6	2.6	2.5	2.5
635.0	7.8	3.2	2.9	2.9	2.8	2.7	2.7	2.6	2.6	2.5
645.0	7.9	3.3	3.0	2.9	2.9	2.8	2.8	2.7	2.7	2.6
655.0	8.1	3.4	3.1	3.0	3.0	2.9	2.8	2.8	2.7	2.7
665.0	8.2	3.5	3.2	3.1	3.0	3.0	2.9	2.9	2.8	2.8

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

6" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
405.0	5.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0
415.0	5.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
425.0	5.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1
435.0	5.4	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2
445.0	5.5	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2
455.0	5.6	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3
465.0	5.7	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3
475.0	5.8	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4
485.0	6.0	1.5	1.5	1.5	1.5	1.5	1.4	1.4	1.4
495.0	6.1	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.5
505.0	6.2	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5
515.0	6.3	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6
525.0	6.5	1.8	1.7	1.7	1.7	1.7	1.7	1.6	1.6
535.0	6.6	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.7
545.0	6.7	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.7
555.0	6.8	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8
565.0	7.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9
575.0	7.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9
585.0	7.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0
595.0	7.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1
605.0	7.4	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1
615.0	7.6	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2
625.0	7.7	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.2
635.0	7.8	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.3
645.0	7.9	2.6	2.5	2.5	2.5	2.5	2.4	2.4	2.4
655.0	8.1	2.7	2.6	2.6	2.6	2.5	2.5	2.5	2.5
665.0	8.2	2.7	2.7	2.7	2.6	2.6	2.6	2.5	2.5

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

8" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
140.0	1.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
160.0	1.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
180.0	1.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
200.0	1.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
220.0	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
240.0	1.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
260.0	1.8	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
280.0	2.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
300.0	2.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
320.0	2.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
340.0	2.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
360.0	2.5	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
380.0	2.7	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
400.0	2.8	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
420.0	3.0	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
440.0	3.1	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
460.0	3.2	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
480.0	3.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
500.0	3.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4
520.0	3.7	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
540.0	3.8	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
560.0	3.9	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5
580.0	4.1	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
600.0	4.2	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
620.0	4.4	0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6
640.0	4.5	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
660.0	4.6	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
680.0	4.8	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.7
700.0	4.9	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

8" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
140.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
160.0	1.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
180.0	1.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
200.0	1.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
220.0	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
240.0	1.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
260.0	1.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
280.0	2.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
300.0	2.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
320.0	2.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
340.0	2.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
360.0	2.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
380.0	2.7	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
400.0	2.8	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
420.0	3.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
440.0	3.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
460.0	3.2	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
480.0	3.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
500.0	3.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
520.0	3.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
540.0	3.8	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4
560.0	3.9	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
580.0	4.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
600.0	4.2	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5
620.0	4.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
640.0	4.5	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6
660.0	4.6	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6
680.0	4.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
700.0	4.9	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

8" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
720.0	5.1	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.8
740.0	5.2	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
760.0	5.3	1.1	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9
780.0	5.5	1.2	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0
800.0	5.6	1.3	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0
820.0	5.8	1.3	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.0
840.0	5.9	1.4	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1
860.0	6.0	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.1
880.0	6.2	1.5	1.4	1.3	1.3	1.3	1.3	1.2	1.2	1.2
900.0	6.3	1.5	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.2
920.0	6.5	1.6	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3
940.0	6.6	1.7	1.6	1.5	1.5	1.4	1.4	1.4	1.4	1.3
960.0	6.7	1.7	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4
980.0	6.9	1.8	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.4
1,000.0	7.0	1.9	1.7	1.7	1.6	1.6	1.6	1.6	1.5	1.5
1,020.0	7.2	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.6	1.6
1,040.0	7.3	2.0	1.9	1.8	1.8	1.7	1.7	1.7	1.6	1.6
1,060.0	7.4	2.1	1.9	1.9	1.8	1.8	1.8	1.7	1.7	1.7
1,080.0	7.6	2.2	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.7
1,100.0	7.7	2.2	2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.8
1,120.0	7.9	2.3	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.8
1,140.0	8.0	2.4	2.2	2.1	2.1	2.0	2.0	2.0	1.9	1.9
1,160.0	8.2	2.4	2.3	2.2	2.2	2.1	2.1	2.0	2.0	2.0
1,180.0	8.3	2.5	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.0
1,200.0	8.4	2.6	2.4	2.4	2.3	2.3	2.2	2.2	2.1	2.1
1,220.0	8.6	2.7	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.2
1,240.0	8.7	2.8	2.6	2.5	2.4	2.4	2.3	2.3	2.3	2.2
1,260.0	8.9	2.8	2.6	2.6	2.5	2.5	2.4	2.4	2.3	2.3
1,280.0	9.0	2.9	2.7	2.7	2.6	2.5	2.5	2.4	2.4	2.4
1,300.0	9.1	3.0	2.8	2.7	2.7	2.6	2.6	2.5	2.5	2.4
1,320.0	9.3	3.1	2.9	2.8	2.7	2.7	2.6	2.6	2.5	2.5

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

8" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
720.0	5.1	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7
740.0	5.2	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8
760.0	5.3	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8
780.0	5.5	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
800.0	5.6	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
820.0	5.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9
840.0	5.9	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0
860.0	6.0	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0
880.0	6.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1
900.0	6.3	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1
920.0	6.5	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2
940.0	6.6	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2
960.0	6.7	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3
980.0	6.9	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.3
1,000.0	7.0	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4
1,020.0	7.2	1.5	1.5	1.5	1.5	1.5	1.4	1.4	1.4
1,040.0	7.3	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.5
1,060.0	7.4	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.5
1,080.0	7.6	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6
1,100.0	7.7	1.8	1.7	1.7	1.7	1.7	1.7	1.6	1.6
1,120.0	7.9	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.7
1,140.0	8.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.7
1,160.0	8.2	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8
1,180.0	8.3	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9
1,200.0	8.4	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9
1,220.0	8.6	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0
1,240.0	8.7	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0
1,260.0	8.9	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1
1,280.0	9.0	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2
1,300.0	9.1	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2
1,320.0	9.3	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.3

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

10" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
210.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
240.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
270.0	1.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
300.0	1.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
330.0	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
360.0	1.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
390.0	1.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
420.0	1.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
450.0	2.0	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
480.0	2.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
510.0	2.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1
540.0	2.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
570.0	2.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
600.0	2.7	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
630.0	2.8	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
660.0	2.9	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
690.0	3.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
720.0	3.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
750.0	3.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
780.0	3.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3
810.0	3.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3
840.0	3.8	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
870.0	3.9	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
900.0	4.0	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
930.0	4.2	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4
960.0	4.3	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
990.0	4.4	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
1,020.0	4.6	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5
1,050.0	4.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5
1,080.0	4.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
1,110.0	5.0	0.8	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

10" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
210.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
240.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
270.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
300.0	1.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
330.0	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
360.0	1.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
390.0	1.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
420.0	1.9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
450.0	2.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
480.0	2.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
510.0	2.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
540.0	2.4	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1
570.0	2.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
600.0	2.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
630.0	2.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
660.0	2.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
690.0	3.1	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
720.0	3.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2
750.0	3.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
780.0	3.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
810.0	3.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
840.0	3.8	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
870.0	3.9	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
900.0	4.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
930.0	4.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
960.0	4.3	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4
990.0	4.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4
1,020.0	4.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
1,050.0	4.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
1,080.0	4.8	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5
1,110.0	5.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

10" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
1,140.0	5.1	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6
1,170.0	5.2	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
1,200.0	5.4	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
1,230.0	5.5	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7
1,260.0	5.6	1.0	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8
1,290.0	5.8	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
1,320.0	5.9	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.8
1,350.0	6.0	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
1,380.0	6.2	1.1	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9
1,410.0	6.3	1.2	1.1	1.1	1.0	1.0	1.0	1.0	1.0	0.9
1,440.0	6.4	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0
1,470.0	6.6	1.3	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0
1,500.0	6.7	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1
1,530.0	6.8	1.4	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1
1,560.0	7.0	1.4	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.1
1,590.0	7.1	1.5	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2
1,620.0	7.2	1.5	1.4	1.4	1.3	1.3	1.3	1.3	1.2	1.2
1,650.0	7.4	1.6	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3
1,680.0	7.5	1.6	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3
1,710.0	7.6	1.7	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.3
1,740.0	7.8	1.7	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4
1,770.0	7.9	1.8	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.4
1,800.0	8.0	1.8	1.7	1.7	1.6	1.6	1.5	1.5	1.5	1.5
1,830.0	8.2	1.9	1.7	1.7	1.7	1.6	1.6	1.6	1.5	1.5
1,860.0	8.3	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.6	1.6
1,890.0	8.4	2.0	1.9	1.8	1.8	1.7	1.7	1.7	1.6	1.6
1,920.0	8.6	2.1	1.9	1.9	1.8	1.8	1.7	1.7	1.7	1.7
1,950.0	8.7	2.1	2.0	1.9	1.9	1.8	1.8	1.8	1.7	1.7
1,980.0	8.8	2.2	2.0	2.0	1.9	1.9	1.8	1.8	1.8	1.8

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

10" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
1,140.0	5.1	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
1,170.0	5.2	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6
1,200.0	5.4	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6
1,230.0	5.5	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
1,260.0	5.6	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7
1,290.0	5.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
1,320.0	5.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
1,350.0	6.0	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8
1,380.0	6.2	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
1,410.0	6.3	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
1,440.0	6.4	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9
1,470.0	6.6	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9
1,500.0	6.7	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,530.0	6.8	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0
1,560.0	7.0	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0
1,590.0	7.1	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1
1,620.0	7.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1
1,650.0	7.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1
1,680.0	7.5	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2
1,710.0	7.6	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2
1,740.0	7.8	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3
1,770.0	7.9	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.3
1,800.0	8.0	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.3
1,830.0	8.2	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.4
1,860.0	8.3	1.5	1.5	1.5	1.5	1.5	1.5	1.4	1.4
1,890.0	8.4	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.5
1,920.0	8.6	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5
1,950.0	8.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6	1.6
1,980.0	8.8	1.7	1.7	1.7	1.7	1.7	1.6	1.6	1.6

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

12" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
300.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
340.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
380.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
420.0	1.3	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
460.0	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
500.0	1.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
540.0	1.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
580.0	1.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
620.0	2.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
660.0	2.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
700.0	2.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
740.0	2.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
780.0	2.5	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
820.0	2.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
860.0	2.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
900.0	2.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
940.0	3.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
980.0	3.1	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,020.0	3.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
1,060.0	3.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2
1,100.0	3.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1,140.0	3.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1,180.0	3.7	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1,220.0	3.9	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
1,260.0	4.0	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3
1,300.0	4.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3
1,340.0	4.2	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
1,380.0	4.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
1,420.0	4.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
1,460.0	4.6	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4
1,500.0	4.7	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
1,540.0	4.9	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
1,580.0	5.0	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

12" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
300.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
340.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
380.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
420.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
460.0	1.5	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
500.0	1.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
540.0	1.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
580.0	1.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
620.0	2.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
660.0	2.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
700.0	2.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
740.0	2.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
780.0	2.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
820.0	2.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
860.0	2.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
900.0	2.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
940.0	3.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
980.0	3.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,020.0	3.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,060.0	3.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1,100.0	3.5	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
1,140.0	3.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2
1,180.0	3.7	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1,220.0	3.9	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1,260.0	4.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1,300.0	4.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
1,340.0	4.2	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3
1,380.0	4.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
1,420.0	4.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
1,460.0	4.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
1,500.0	4.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
1,540.0	4.9	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4
1,580.0	5.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

12" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	40°F (4°C)	50°F (10°C)	60°F (16°C)	70°F (21°C)	80°F (27°C)	90°F (32°C)	100°F (38°C)	110°F (43°C)	120°F (49°C)
1,620.0	5.1	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5
1,660.0	5.2	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5
1,700.0	5.4	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6
1,740.0	**5.5**	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6
1,780.0	5.6	0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6
1,820.0	5.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6
1,860.0	5.9	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
1,900.0	6.0	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
1,940.0	6.1	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7
1,980.0	6.2	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8
2,020.0	6.4	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8
2,060.0	6.5	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8
2,100.0	6.6	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.8
2,140.0	6.8	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
2,180.0	6.9	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9
2,220.0	7.0	1.2	1.1	1.0	1.0	1.0	1.0	1.0	0.9	0.9
2,260.0	7.1	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0
2,300.0	7.3	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0
2,340.0	7.4	1.3	1.2	1.2	1.1	1.1	1.1	1.1	1.0	1.0
2,380.0	7.5	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1
2,420.0	7.6	1.4	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1
2,460.0	7.8	1.4	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1
2,500.0	7.9	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2
2,540.0	8.0	1.5	1.4	1.3	1.3	1.3	1.3	1.2	1.2	1.2
2,580.0	8.1	1.5	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.2
2,620.0	8.3	1.6	1.5	1.4	1.4	1.4	1.3	1.3	1.3	1.3
2,660.0	8.4	1.6	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

12" ChlorFIT Schedule 80 Corzan CPVC – 100% Water – Feet of Head per 100 Feet (continued)

GPM	Velocity (ft./sec.)	130°F (54°C)	140°F (60°C)	150°F (66°C)	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)
1,620.0	5.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
1,660.0	5.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
1,700.0	5.4	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5
1,740.0	5.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5
1,780.0	5.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
1,820.0	5.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
1,860.0	5.9	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6
1,900.0	6.0	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6
1,940.0	6.1	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
1,980.0	6.2	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
2,020.0	6.4	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7
2,060.0	6.5	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7
2,100.0	6.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
2,140.0	6.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8
2,180.0	6.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
2,220.0	7.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
2,260.0	7.1	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9
2,300.0	7.3	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
2,340.0	7.4	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9
2,380.0	7.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2,420.0	7.6	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0
2,460.0	7.8	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0
2,500.0	7.9	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
2,540.0	8.0	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1
2,580.0	8.1	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1
2,620.0	8.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
2,660.0	8.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2

5 fps max. velocity for DHW, DHW-R, HHW

8 fps max. velocity for DCW, CCW

Appendix D: Equivalent Lengths and C_v Values

Tee ChlorFIT Corzan CPVC (S x S x S)

Part No.	Tee ChlorFIT Corzan CPVC (S x S x S)		Eq. Length
9801005	½" Tee (S x S x S)	Run	1
		Branch	4
9801007	¾" Tee (S x S x S)	Run	1.4
		Branch	5
9801010	1" Tee (S x S x S)	Run	1.7
		Branch	6
9801012	1¼" Tee (S x S x S)	Run	2.3
		Branch	7
9801015	1½" Tee (S x S x S)	Run	2.7
		Branch	8.1
9801020	2" Tee (S x S x S)	Run	4.3
		Branch	12
9801025	2½" Tee (S x S x S)	Run	5.1
		Branch	14.7
9801030	3" Tee (S x S x S)	Run	6.2
		Branch	16.3
9801040	4" Tee (S x S x S)	Run	8.3
		Branch	22
9801060	6" Tee (S x S x S)	Run	12.5
		Branch	32.2
9801080	8" Tee (S x S x S)	Run	16.5
		Branch	39.7

Reducing Tee ChlorFIT Corzan CPVC (S x S x S)

Part No.	Reducing Tee ChlorFIT Corzan CPVC (S x S x S)		Eq. Length
9801101	¾" x ½" Reducing Tee (S x S x S)	Run	1.4
		Branch	4
9801130	1" x ½" Reducing Tee (S x S x S)	Run	1.7
		Branch	4
9801131	1" x ¾" Reducing Tee (S x S x S)	Run	1.7
		Branch	5
9801166FB	1¼" x ½" Reducing Tee (S x S x S) – Bushed	Run	2.3
		Branch	4
9801167FB	1¼" x ¾" Reducing Tee (S x S x S) – Bushed	Run	2.3
		Branch	4
9801168	1¼" x 1" Reducing Tee (S x S x S)	Run	2.3
		Branch	6
9801209	1½" x ½" Reducing Tee (S x S x S)	Run	2.3
		Branch	4
9801210	1½" x ¾" Reducing Tee (S x S x S)	Run	2.3
		Branch	5
9801211	1½" x 1" Reducing Tee (S x S x S)	Run	2.3
		Branch	6
9801212FB	1½" x 1¼" Reducing Tee (S x S x S) – Bushed	Run	2.3
		Branch	7
9801247	2" x ½" Reducing Tee (S x S x S)	Run	4.3
		Branch	4
9801248	2" x ¾" Reducing Tee (S x S x S)	Run	4.3
		Branch	5
9801249	2" x 1" Reducing Tee (S x S x S)	Run	4.3
		Branch	6
9801250FB	2" x 1¼" Reducing Tee (S x S x S) – Bushed	Run	4.3
		Branch	7
9801251	2" x 1½" Reducing Tee (S x S x S)	Run	4.3
		Branch	8.1
9801287FB	2½" x ½" Reducing Tee (S x S x S) – Bushed	Run	5.1
		Branch	4

Reducing Tee ChlorFIT Corzan CPVC (S x S x S) (continued)

Part No.	Reducing Tee ChlorFIT Corzan CPVC (S x S x S)		Eq. Length
9801288FB	2½" x ¾" Reducing Tee (S x S x S) – Bushed	Run	5.1
		Branch	5
9801289FB	2½" x 1" Reducing Tee (S x S x S) – Bushed	Run	5.1
		Branch	6
9801290FB	2½" x 1¼" Reducing Tee (S x S x S) – Bushed	Run	5.1
		Branch	7
9801291FB	2½" x 1½" Reducing Tee (S x S x S) – Bushed	Run	5.1
		Branch	8.1
9801292	2½" x 2" Reducing Tee (S x S x S)	Run	5.1
		Branch	12
9801333FB	3" x ½" Reducing Tee (S x S x S) – Bushed	Run	6.2
		Branch	4
9801334FB	3" x ¾" Reducing Tee (S x S x S) – Bushed	Run	6.2
		Branch	5
9801335FB	3" x 1" Reducing Tee (S x S x S) – Bushed	Run	6.2
		Branch	6
9801336FB	3" x 1¼" Reducing Tee (S x S x S) – Bushed	Run	6.2
		Branch	7
9801337FB	3" x 1½" Reducing Tee (S x S x S) – Bushed	Run	6.2
		Branch	8.1
9801338	3" x 2" Reducing Tee (S x S x S)	Run	6.2
		Branch	12
9801339FB	3" x 2½" Reducing Tee (S x S x S) – Bushed	Run	6.2
		Branch	14.7
9801415FB	4" x ½" Reducing Tee (S x S x S) – Bushed	Run	8.3
		Branch	4
9801416FB	4" x ¾" Reducing Tee (S x S x S) – Bushed	Run	8.3
		Branch	5
9801417FB	4" x 1" Reducing Tee (S x S x S) – Bushed	Run	8.3
		Branch	6
9801418FB	4" x 1¼" Reducing Tee (S x S x S) – Bushed	Run	8.3
		Branch	7
9801419FB	4" x 1½" Reducing Tee (S x S x S) – Bushed	Run	8.3
		Branch	8.1

Reducing Tee ChlorFIT Corzan CPVC (S x S x S) (continued)

Part No.	Reducing Tee ChlorFIT Corzan CPVC (S x S x S)		Eq. Length
9801420	4" x 2" Reducing Tee (S x S x S)	Run	8.3
		Branch	12
9801421FB	4" x 2½" Reducing Tee (S x S x S) – Bushed	Run	8.3
		Branch	14.7
9801422	4" x 3" Reducing Tee (S x S x S)	Run	8.3
		Branch	16.3
9801523FB	6" x ½" Reducing Tee (S x S x S) – Bushed	Run	12.5
		Branch	4
9801524FB	6" x ¾" Reducing Tee (S x S x S) – Bushed	Run	12.5
		Branch	5
9801525FB	6" x 1" Reducing Tee (S x S x S) – Bushed	Run	12.5
		Branch	6
9801526FB	6" x 1¼" Reducing Tee (S x S x S) – Bushed	Run	12.5
		Branch	7
9801527FB	6" x 1½" Reducing Tee (S x S x S) – Bushed	Run	12.5
		Branch	8.1
9801528	6" x 2" Reducing Tee (S x S x S)	Run	12.5
		Branch	12
9801529FB	6" x 2½" Reducing Tee (S x S x S) – Bushed – 2 Step	Run	12.5
		Branch	14.7
9801530FB	6" x 3" Reducing Tee (S x S x S) – Bushed	Run	12.5
		Branch	16.3
9801532	6" x 4" Reducing Tee (S x S x S)	Run	12.5
		Branch	22
9801574FB	8" x ¾" Reducing Tee (S x S x S) – Bushed – 3 Step	Run	16.5
		Branch	5
9801575FB	8" x 1" Reducing Tee (S x S x S) – Bushed – 2 Step	Run	16.5
		Branch	6
9801577FB	8" x 1½" Reducing Tee (S x S x S) – Bushed – 2 Step	Run	16.5
		Branch	8.1
9801578FB	8" x 2" Reducing Tee (S x S x S) – Bushed – 2 Step	Run	16.5
		Branch	12
9801579FB	8" x 2½" Reducing Tee (S x S x S) – Bushed – 2 Step	Run	16.5
		Branch	14.7

Reducing Tee ChlorFIT Corzan CPVC (S x S x S) (continued)

Part No.	Reducing Tee ChlorFIT Corzan CPVC (S x S x S)		Eq. Length
9801580FB	8" x 3" Reducing Tee (S x S x S) – Bushed	Run	16.5
		Branch	16.3
9801582FB	8" x 4" Reducing Tee (S x S x S) – Bushed	Run	16.5
		Branch	22
9801585	8" x 6" Reducing Tee (S x S x S)	Run	16.5
		Branch	32.2

90° ELL ChlorFIT Corzan CPVC (S x S)

Part No.	90° ELL ChlorFIT Corzan CPVC (S x S)	Eq. Length
9806005	½" 90° Elbow (S x S)	1.5
9806007	¾" 90° Elbow (S x S)	2
9806010	1" 90° Elbow (S x S)	206
9806012	1¼" 90° Elbow (S x S)	3.8
9806015	1½" 90° Elbow (S x S)	4
9806020	2" 90° Elbow (S x S)	5.7
9806025	2½" 90° Elbow (S x S)	6.9
9806030	3" 90° Elbow (S x S)	7.9
9806040	4" 90° Elbow (S x S)	11.4
9806060	6" 90° Elbow (S x S)	16.7
9806080	8" 90° Elbow (S x S)	21

45° ELL ChlorFIT Corzan CPVC (S x S)

Part No.	45° ELL ChlorFIT Corzan CPVC (S x S)	Eq. Length
9817005	½" 45° Elbow (S x S)	0.8
9817007	¾" 45° Elbow (S x S)	1.1
9817010	1" 45° Elbow (S x S)	1.4
9817012	1¼" 45° Elbow (S x S)	1.8
9817015	1½" 45° Elbow (S x S)	2.1
9817020	2" 45° Elbow (S x S)	2.7
9817025	2½" 45° Elbow (S x S)	3.3
9817030	3" 45° Elbow (S x S)	4.1
9817040	4" 45° Elbow (S x S)	5.3
9817060	6" 45° Elbow (S x S)	8
9817080	8" 45° Elbow (S x S)	10.6

Coupling ChlorFIT Corzan CPVC (S x S)

Part No.	Coupling ChlorFIT Corzan CPVC (S x S)	Eq. Length
9829005	½" Coupling (S x S)	0.8
9829007	¾" Coupling (S x S)	1.1
9829010	1" Coupling (S x S)	1.4
9829012	1¼" Coupling (S x S)	1.8
9829015	1½" Coupling (S x S)	2.1
9829020	2" Coupling (S x S)	2.7
9829025	2½" Coupling (S x S)	3.3
9829030	3" Coupling (S x S)	4.1
9829040	4" Coupling (S x S)	5.3
9829060	6" Coupling (S x S)	8
9829080	8" Coupling (S x S)	10.6

Reducing Coupling ChlorFIT Corzan CPVC (S x S)

Part No.	Reducing Coupling ChlorFIT Corzan CPVC (S x S)	Eq. Length
9829101	¾" x ½" Reducing Coupling (S x S)	0.8
9829130	1" x ½" Reducing Coupling (S x S)	0.8
9829131	1" x ¾" Reducing Coupling (S x S)	1.1
9829167FB	1¼" x ¾" Reducing Coupling (S x S) – Bushed	1.1
982968FB	1¼" x 1" Reducing Coupling (S x S) – Bushed	1.4
9829209FB	1½" x ½" Reducing Coupling (S x S) – Bushed	0.8
9829210FB	1½" x ¾" Reducing Coupling (S x S) – Bushed	1.1
9829211	1½" x 1" Reducing Coupling (S x S)	1.4
9829212	1½" x 1¼" Reducing Coupling (S x S)	1.8
9829247FB	2" x ½" Reducing Coupling (S x S) – Bushed	0.8
9829248FB	2" x ¾" Reducing Coupling (S x S) – Bushed	1.1
9829249	2" x 1" Reducing Coupling (S x S)	1.4
9829250	2" x 1¼" Reducing Coupling (S x S)	1.8
9829251	2" x 1½" Reducing Coupling (S x S)	2.1
9829287FB	2½" x ½" Reducing Coupling (S x S) – Bushed	0.8
9829288FB	2½" x ¾" Reducing Coupling (S x S) – Bushed	1.1
9829289FB	2½" x 1" Reducing Coupling (S x S) – Bushed	1.4
9829290FB	2½" x 1¼" Reducing Coupling (S x S) – Bushed	1.8
9829291	2½" x 1½" Reducing Coupling (S x S)	2.1
9829292FB	2½" x 2" Reducing Coupling (S x S) – Bushed	2.7
9829335FB	3" x 1" Reducing Coupling (S x S) – Bushed	1.4
9829337FB	3" x 1½" Reducing Coupling (S x S) – Bushed	2.1
9829338	3" x 2" Reducing Coupling (S x S)	2.7
9829339FB	3" x 2½" Reducing Coupling (S x S) – Bushed	3.3
9829417FB	4" x 1" Reducing Coupling (S x S) – Bushed	1.4
9829419FB	4" x 1½" Reducing Coupling (S x S) – Bushed	2.1
9829420FB	4" x 2" Reducing Coupling (S x S) – Bushed	2.7
9829421FB	4" x 2½" Reducing Coupling (S x S) – Bushed	3.3
9829422	4" x 3" Reducing Coupling (S x S)	4.1
9829527FB	6" x 1½" Reducing Coupling (S x S) – Bushed – 3 Step	2.1
9829528FB	6" x 2" Reducing Coupling (S x S) – Bushed	2.7
9829529FB	6" x 2½" Reducing Coupling (S x S) – Bushed – 2 Step	3.3
9829530FB	6" x 3" Reducing Coupling (S x S) – Bushed	4.1
9829532	6" x 4" Reducing Coupling (S x S)	5.3
9829582FB	8" x 4" Reducing Coupling (S x S) – Bushed	5.3
9829585	8" x 6" Reducing Coupling (S x S)	8

Reducer Bushing Flush Style ChlorFIT Corzan CPVC (Spg x S)

Part No.	Reducer Bushing Flush Style ChlorFIT Corzan CPVC (Spg x S)	Eq. Length
9837101	¾" x ½" Reducer Bushing Flush Style (Spg x S)	1
9837130	1" x ½" Reducer Bushing Flush Style (Spg x S)	1
9837131	1" x ¾" Reducer Bushing Flush Style (Spg x S)	1.5
9837166	1¼" x ½" Reducer Bushing Flush Style (Spg x S)	1
9837167	1¼" x ¾" Reducer Bushing Flush Style (Spg x S)	1.5
9837168	1¼" x 1" Reducer Bushing Flush Style (Spg x S)	2
9837209	1½" x ½" Reducer Bushing Flush Style (Spg x S)	1
9837210	1½" x ¾" Reducer Bushing Flush Style (Spg x S)	1.5
9837211	1½" x 1" Reducer Bushing Flush Style (Spg x S)	2
9837212	1½" x 1¼" Reducer Bushing Flush Style (Spg x S)	2.8
9837247	2" x ½" Reducer Bushing Flush Style (Spg x S)	1
9837248	2" x ¾" Reducer Bushing Flush Style (Spg x S)	1.5
9837249	2" x 1" Reducer Bushing Flush Style (Spg x S)	2
9837250	2" x 1¼" Reducer Bushing Flush Style (Spg x S)	2.8
9837251	2" x 1½" Reducer Bushing Flush Style (Spg x S)	3.5
9837291	2½" x 1½" Reducer Bushing Flush Style (Spg x S)	3.5
9837292	2½" x 2" Reducer Bushing Flush Style (Spg x S)	4.5
9837335	3" x 1" Reducer Bushing Flush Style (Spg x S)	2
9837337	3" x 1½" Reducer Bushing Flush Style (Spg x S)	3.5
9837338	3" x 2" Reducer Bushing Flush Style (Spg x S)	4.5
9837339	3" x 2½" Reducer Bushing Flush Style (Spg x S)	5.5
9837420	4" x 2" Reducer Bushing Flush Style (Spg x S)	4.5
9837421FB	4" x 2½" Reducer Bushing Flush Style (Spg x S) – Bushed	5.5
9837422	4" x 3" Reducer Bushing Flush Style (Spg x S)	6.5
9837529FB	6" x 2½" Reducer Bushing Flush Style (Spg x S) – Bushed	5.5
9837530	6" x 3" Reducer Bushing Flush Style (Spg x S)	6.5
9837532	6" x 4" Reducer Bushing Flush Style (Spg x S)	9
9837582FB	8" x 4" Reducer Bushing Flush Style (Spg x S)	9
9837585	8" x 6" Reducer Bushing Flush Style (Spg x S)	14

Van Stone Flange 150 PSI at 73°F (S), Class 150

Part No.	Van Stone Flange 150 PSI at 73°F (S), Class 150	Eq. Length
9854005	½" Van Stone Flange 150 PSI at 73°F (S), Class 150	1
9854007	¾" Van Stone Flange 150 PSI at 73°F (S), Class 150	1.5
9854010	1" Van Stone Flange 150 PSI at 73°F (S), Class 150	2
9854012	1¼" Van Stone Flange 150 PSI at 73°F (S), Class 150	2.8
9854015	1½" Van Stone Flange 150 PSI at 73°F (S), Class 150	3.5
9854020	2" Van Stone Flange 150 PSI at 73°F (S), Class 150	4.5
9854025	2½" Van Stone Flange 150 PSI at 73°F (S), Class 150	5.5
9854030	3" Van Stone Flange 150 PSI at 73°F (S), Class 150	6.5
9854040	4" Van Stone Flange 150 PSI at 73°F (S), Class 150	9
9854060	6" Van Stone Flange 150 PSI at 73°F (S), Class 150	14
9854080	8" Van Stone Flange 150 PSI at 73°F (S), Class 150	19

Full Pressure Van Stone Flange Kit (S)

Part No.	Full Pressure Van Stone Flange Kit (S)	Eq. Length
37Z000267	2½" CPVC Full Pressure Van Stone Flange Kit (S)	5.5
37Z000268	3" CPVC Full Pressure Van Stone Flange Kit (S)	6.5
37Z000269	4" CPVC Full Pressure Van Stone Flange Kit (S)	9
37Z000270	6" CPVC Full Pressure Van Stone Flange Kit (S)	14

Type 375 Schedule 80 CPVC/EPDM Ball Valve

Part No.	Type 375 Schedule 80 CPVC/EPDM Ball Valve	Eq. Length
163375007	2" Type 375 Schedule 80 CPVC/EPDM Ball Valve	1.4
163375008	2½" Type 375 Schedule 80 CPVC/EPDM Ball Valve	1.7
163375009	3" Type 375 Schedule 80 CPVC/EPDM Ball Valve	2
163375010	4" Type 375 Schedule 80 CPVC/EPDM Ball Valve	2.7

Appendix E: Pipe Heat Loss and Surface Temperature

½" Water Temperature (°F)	Heat Loss (btu/ft. • hr.) No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	-7.4	-4.5	-3.5	-3.0	-2.7
40	-5.5	-3.4	-2.6	-2.2	-2.0
50	-3.7	-2.2	-1.7	-1.5	-1.3
60	-1.8	-1.1	-0.9	-0.7	-0.7
70	0.0	0.0	0.0	0.0	0.0
80	1.8	1.1	0.9	0.7	0.7
90	3.7	2.2	1.7	1.5	1.3
100	5.5	3.4	2.6	2.2	2.0
110	7.4	4.5	3.5	3.0	2.7
120	9.2	5.6	4.3	3.7	3.3
130	11.1	6.7	5.2	4.5	4.0
140	12.9	7.8	6.1	5.2	4.7
150	14.8	9.0	6.9	5.9	5.3
160	16.6	10.1	7.8	6.7	6.0
170	18.5	11.2	8.7	7.4	6.7
180	20.3	12.3	9.5	8.2	7.3
190	22.2	13.4	10.4	8.9	8.0
200	24.0	14.6	11.3	9.6	8.6

½" Water Temperature (°F)	Surface Temperature (°F) No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	36.4	60.7	65.3	67.0	67.9
40	44.8	63.0	66.5	67.8	68.4
50	53.2	65.4	67.7	68.5	69.0
60	61.6	67.7	68.8	69.3	69.5
70	70.0	70.0	70.0	70.0	70.0
80	78.4	72.3	71.2	70.7	70.5
90	86.8	74.6	72.3	71.5	71.0
100	95.2	77.0	73.5	72.2	71.6
110	103.6	79.3	74.7	73.0	72.1
120	112.0	81.6	75.8	73.7	72.6
130	120.4	83.9	77.0	74.4	73.1
140	128.8	86.3	78.2	75.2	73.7
150	137.2	88.6	79.3	75.9	74.2
160	145.6	90.9	80.5	76.6	74.7
170	154.0	93.2	81.7	77.4	75.2
180	162.4	95.6	82.8	78.1	75.8
190	170.8	97.9	84.0	78.9	76.3
200	179.2	100.2	85.2	79.6	76.8

1. All calculations based on cylindrical thermal resistance methodology (ASHRAE).
2. Pipe convection set to be 1.00 Btu/hr. • ft^2 • °F (based on standard value for free convection of air).
3. This heat loss comparison uses 0.25 Btu • in./(hr. • $ft.^2$ •°F) as the insulation thermal conductivity. This is a standard value for fiberglass pipe insulation at a 100°F/37.8°C mean temperature.

¾"	Heat Loss (btu/ft. • hr.)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	-9.2	-5.2	-4.0	-3.3	-3.0
40	-6.9	-3.9	-3.0	-2.5	-2.2
50	-4.6	-2.6	-2.0	-1.7	-1.5
60	-2.3	-1.3	-1.0	-0.8	-0.7
70	0.0	0.0	0.0	0.0	0.0
80	2.3	1.3	1.0	0.8	0.7
90	4.6	2.6	2.0	1.7	1.5
100	6.9	3.9	3.0	2.5	2.2
110	9.2	5.2	4.0	3.3	3.0
120	11.5	6.5	5.0	4.2	3.7
130	13.8	7.8	5.9	5.0	4.5
140	16.1	9.1	6.9	5.9	5.2
150	18.4	10.4	7.9	6.7	5.9
160	20.8	11.7	8.9	7.5	6.7
170	23.1	13.0	9.9	8.4	7.4
180	25.4	14.3	10.9	9.2	8.2
190	27.7	15.6	11.9	10.0	8.9
200	30.0	16.9	12.9	10.9	9.7

¾"	Surface Temperature (°F)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	36.5	60.3	65.0	66.8	67.8
40	44.8	62.7	66.3	67.6	68.3
50	53.2	65.1	67.5	68.4	68.9
60	61.6	67.6	68.8	69.2	69.4
70	70.0	70.0	70.0	70.0	70.0
80	78.4	72.4	71.2	70.8	70.6
90	86.8	74.9	72.5	71.6	71.1
100	95.2	77.3	73.7	72.4	71.7
110	103.5	79.7	75.0	73.2	72.2
120	111.9	82.1	76.2	73.9	72.8
130	120.3	84.6	77.4	74.7	73.4
140	128.7	87.0	78.7	75.5	73.9
150	137.1	89.4	79.9	76.3	74.5
160	145.5	91.9	81.2	77.1	75.1
170	153.9	94.3	82.4	77.9	75.6
180	162.3	96.7	83.6	78.7	76.2
190	170.6	99.1	84.9	79.5	76.7
200	179.0	101.6	86.1	80.3	77.3

1. All calculations based on cylindrical thermal resistance methodology (ASHRAE).
2. Pipe convection set to be 1.00 Btu/hr. • ft^2 • °F (based on standard value for free convection of air).
3. This heat loss comparison uses 0.25 Btu • in./(hr. • ft.^{2} •°F) as the insulation thermal conductivity.
   This is a standard value for fiberglass pipe insulation at a 100°F/37.8°C mean temperature.

1"	Heat Loss (btu/ft. • hr.)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	-11.3	-6.1	-4.5	-3.8	-3.3
40	-8.5	-4.5	-3.4	-2.8	-2.5
50	-5.6	-3.0	-2.3	-1.9	-1.7
60	-2.8	-1.5	-1.1	-0.9	-0.8
70	0.0	0.0	0.0	0.0	0.0
80	2.8	1.5	1.1	0.9	0.8
90	5.6	3.0	2.3	1.9	1.7
100	8.5	4.5	3.4	2.8	2.5
110	11.3	6.1	4.5	3.8	3.3
120	14.1	7.6	5.6	4.7	4.2
130	16.9	9.1	6.8	5.7	5.0
140	19.7	10.6	7.9	6.6	5.8
150	22.6	12.1	9.0	7.5	6.7
160	25.4	13.6	10.2	8.5	7.5
170	28.2	15.1	11.3	9.4	8.3
180	31.0	16.6	12.4	10.4	9.1
190	33.9	18.2	13.6	11.3	10.0
200	36.7	19.7	14.7	12.3	10.8

1"	Surface Temperature (°F)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	37.2	60.0	64.8	66.7	67.6
40	45.4	62.5	66.1	67.5	68.2
50	53.6	65.0	67.4	68.3	68.8
60	61.8	67.5	68.7	69.2	69.4
70	70.0	70.0	70.0	70.0	70.0
80	78.2	72.5	71.3	70.8	70.6
90	86.4	75.0	72.6	71.7	71.2
100	94.6	77.5	73.9	72.5	71.8
110	102.8	80.0	75.2	73.3	72.4
120	111.0	82.5	76.5	74.2	73.0
130	119.2	85.0	77.8	75.0	73.6
140	127.4	87.5	79.1	75.8	74.2
150	135.6	90.0	80.4	76.7	74.8
160	143.7	92.5	81.7	77.5	75.4
170	151.9	95.0	83.0	78.3	76.0
180	160.1	97.5	84.3	79.2	76.6
190	168.3	100.0	85.6	80.0	77.2
200	176.5	102.4	86.9	80.9	77.8

1. All calculations based on cylindrical thermal resistance methodology (ASHRAE).
2. Pipe convection set to be 1.00 Btu/hr. • ft^2 • °F (based on standard value for free convection of air).
3. This heat loss comparison uses 0.25 Btu • in./(hr. • ft.^{2} •°F) as the insulation thermal conductivity. This is a standard value for fiberglass pipe insulation at a 100°F/37.8°C mean temperature.

1¼"	Heat Loss (btu/ft. • hr.)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	-14.1	-7.2	-5.3	-4.3	-3.8
40	-10.6	-5.4	-3.9	-3.2	-2.8
50	-7.1	-3.6	-2.6	-2.2	-1.9
60	-3.5	-1.8	-1.3	-1.1	-0.9
70	0.0	0.0	0.0	0.0	0.0
80	3.5	1.8	1.3	1.1	0.9
90	7.1	3.6	2.6	2.2	1.9
100	10.6	5.4	3.9	3.2	2.8
110	14.1	7.2	5.3	4.3	3.8
120	17.7	9.0	6.6	5.4	4.7
130	21.2	10.8	7.9	6.5	5.7
140	24.8	12.6	9.2	7.6	6.6
150	28.3	14.4	10.5	8.7	7.6
160	31.8	16.2	11.8	9.7	8.5
170	35.4	18.0	13.1	10.8	9.5
180	38.9	19.8	14.5	11.9	10.4
190	42.4	21.6	15.8	13.0	11.4
200	46.0	23.4	17.1	14.1	12.3

1¼"	Surface Temperature (°F)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	37.5	59.7	64.5	66.4	67.4
40	45.6	62.3	65.9	67.3	68.1
50	53.7	64.8	67.3	68.2	68.7
60	61.9	67.4	68.6	69.1	69.4
70	70.0	70.0	70.0	70.0	70.0
80	78.1	72.6	71.4	70.9	70.6
90	86.3	75.2	72.7	71.8	71.3
100	94.4	77.7	74.1	72.7	71.9
110	102.5	80.3	75.5	73.6	72.6
120	110.7	82.9	76.9	74.4	73.2
130	118.8	85.5	78.2	75.3	73.8
140	127.0	88.1	79.6	76.2	74.5
150	135.1	90.6	81.0	77.1	75.1
160	143.2	93.2	82.3	78.0	75.7
170	151.4	95.8	83.7	78.9	76.4
180	159.5	98.4	85.1	79.8	77.0
190	167.6	101.0	86.5	80.7	77.7
200	175.8	103.5	87.8	81.5	78.3

1. All calculations based on cylindrical thermal resistance methodology (ASHRAE).
2. Pipe convection set to be 1.00 Btu/hr. • ft^2 • °F (based on standard value for free convection of air).
3. This heat loss comparison uses 0.25 Btu • in./(hr. • $ft.^2$ •°F) as the insulation thermal conductivity. This is a standard value for fiberglass pipe insulation at a 100°F/37.8°C mean temperature.

1½"	Heat Loss (btu/ft. • hr.)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	-16.1	-8.0	-5.8	-4.7	-4.1
40	-12.1	-6.0	-4.3	-3.5	-3.1
50	-8.0	-4.0	-2.9	-2.4	-2.0
60	-4.0	-2.0	-1.4	-1.2	-1.0
70	0.0	0.0	0.0	0.0	0.0
80	4.0	2.0	1.4	1.2	1.0
90	8.0	4.0	2.9	2.4	2.0
100	12.1	6.0	4.3	3.5	3.1
110	16.1	8.0	5.8	4.7	4.1
120	20.1	10.0	7.2	5.9	5.1
130	24.1	11.9	8.6	7.1	6.1
140	28.2	13.9	10.1	8.2	7.2
150	32.2	15.9	11.5	9.4	8.2
160	36.2	17.9	13.0	10.6	9.2
170	40.2	19.9	14.4	11.8	10.2
180	44.2	21.9	15.8	13.0	11.2
190	48.3	23.9	17.3	14.1	12.3
200	52.3	25.9	18.7	15.3	13.3

1½"	Surface Temperature (°F)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	37.7	59.5	64.4	66.3	67.4
40	45.7	62.1	65.8	67.2	68.0
50	53.8	64.8	67.2	68.2	68.7
60	61.9	67.4	68.6	69.1	69.3
70	70.0	70.0	70.0	70.0	70.0
80	78.1	72.6	71.4	70.9	70.7
90	86.2	75.2	72.8	71.8	71.3
100	94.3	77.9	74.2	72.8	72.0
110	102.3	80.5	75.6	73.7	72.6
120	110.4	83.1	77.0	74.6	73.3
130	118.5	85.7	78.5	75.5	74.0
140	126.6	88.4	79.9	76.4	74.6
150	134.7	91.0	81.3	77.3	75.3
160	142.8	93.6	82.7	78.3	76.0
170	150.8	96.2	84.1	79.2	76.6
180	158.9	98.8	85.5	80.1	77.3
190	167.0	101.5	86.9	81.0	77.9
200	175.1	104.1	88.3	81.9	78.6

1. All calculations based on cylindrical thermal resistance methodology (ASHRAE).
2. Pipe convection set to be 1.00 Btu/hr. • ft^2 • °F (based on standard value for free convection of air).
3. This heat loss comparison uses 0.25 Btu • in./(hr. • $ft.^2$ •°F) as the insulation thermal conductivity.
   This is a standard value for fiberglass pipe insulation at a 100°F/37.8°C mean temperature.

2"	Heat Loss (btu/ft. • hr.)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	-19.8	-9.5	-6.7	-5.4	-4.7
40	-14.9	-7.1	-5.0	-4.1	-3.5
50	-9.9	-4.7	-3.4	-2.7	-2.3
60	-5.0	-2.4	-1.7	-1.4	-1.2
70	0.0	0.0	0.0	0.0	0.0
80	5.0	2.4	1.7	1.4	1.2
90	9.9	4.7	3.4	2.7	2.3
100	14.9	7.1	5.0	4.1	3.5
110	19.8	9.5	6.7	5.4	4.7
120	24.8	11.8	8.4	6.8	5.8
130	29.7	14.2	10.1	8.2	7.0
140	34.7	16.6	11.8	9.5	8.2
150	39.7	18.9	13.4	10.9	9.4
160	44.6	21.3	15.1	12.2	10.5
170	49.6	23.7	16.8	13.6	11.7
180	54.5	26.0	18.5	14.9	12.9
190	59.5	28.4	20.2	16.3	14.0
200	64.5	30.8	21.9	17.7	15.2

2"	Surface Temperature (°F)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	38.1	59.3	64.1	66.1	67.2
40	46.1	62.0	65.6	67.1	67.9
50	54.1	64.6	67.1	68.1	68.6
60	62.0	67.3	68.5	69.0	69.3
70	70.0	70.0	70.0	70.0	70.0
80	78.0	72.7	71.5	71.0	70.7
90	85.9	75.4	72.9	71.9	71.4
100	93.9	78.0	74.4	72.9	72.1
110	101.9	80.7	75.9	73.9	72.8
120	109.9	83.4	77.3	74.8	73.5
130	117.8	86.1	78.8	75.8	74.2
140	125.8	88.8	80.3	76.8	74.9
150	133.8	91.4	81.7	77.7	75.6
160	141.8	94.1	83.2	78.7	76.3
170	149.7	96.8	84.7	79.7	77.0
180	157.7	99.5	86.1	80.6	77.7
190	165.7	102.1	87.6	81.6	78.4
200	173.7	104.8	89.1	82.6	79.1

1. All calculations based on cylindrical thermal resistance methodology (ASHRAE).
2. Pipe convection set to be 1.00 Btu/hr. • ft^2 • °F (based on standard value for free convection of air).
3. This heat loss comparison uses 0.25 Btu • in./(hr. • $ft.^2$ •°F) as the insulation thermal conductivity. This is a standard value for fiberglass pipe insulation at a 100°F/37.8°C mean temperature.

2½"	Heat Loss (btu/ft. • hr.)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	-22.8	-10.8	-7.6	-6.1	-5.2
40	-17.1	-8.1	-5.7	-4.6	-3.9
50	-11.4	-5.4	-3.8	-3.1	-2.6
60	-5.7	-2.7	-1.9	-1.5	-1.3
70	0.0	0.0	0.0	0.0	0.0
80	5.7	2.7	1.9	1.5	1.3
90	11.4	5.4	3.8	3.1	2.6
100	17.1	8.1	5.7	4.6	3.9
110	22.8	10.8	7.6	6.1	5.2
120	28.4	13.5	9.5	7.6	6.5
130	34.1	16.2	11.4	9.2	7.8
140	39.8	18.9	13.3	10.7	9.2
150	45.5	21.6	15.2	12.2	10.5
160	51.2	24.4	17.2	13.8	11.8
170	56.9	27.1	19.1	15.3	13.1
180	62.6	29.8	21.0	16.8	14.4
190	68.3	32.5	22.9	18.4	15.7
200	73.9	35.2	24.8	19.9	17.0

2½"	Surface Temperature (°F)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	39.8	59.3	64.0	66.0	67.1
40	47.3	62.0	65.5	67.0	67.8
50	54.9	64.7	67.0	68.0	68.5
60	62.4	67.3	68.5	69.0	69.3
70	70.0	70.0	70.0	70.0	70.0
80	77.6	72.7	71.5	71.0	70.7
90	85.1	75.3	73.0	72.0	71.5
100	92.7	78.0	74.5	73.0	72.2
110	100.2	80.7	76.0	74.0	72.9
120	107.8	83.3	77.5	75.0	73.6
130	115.3	86.0	79.0	76.0	74.4
140	122.9	88.7	80.5	77.0	75.1
150	130.5	91.3	81.9	78.0	75.8
160	138.0	94.0	83.4	78.9	76.5
170	145.6	96.7	84.9	79.9	77.3
180	153.1	99.3	86.4	80.9	78.0
190	160.7	102.0	87.9	81.9	78.7
200	168.2	104.7	89.4	82.9	79.4

1. All calculations based on cylindrical thermal resistance methodology (ASHRAE).
2. Pipe convection set to be 1.00 Btu/hr. • ft^2 • °F (based on standard value for free convection of air).
3. This heat loss comparison uses 0.25 Btu • in./(hr. • ft.^{2} •°F) as the insulation thermal conductivity.
   This is a standard value for fiberglass pipe insulation at a 100°F/37.8°C mean temperature.

3"	Heat Loss (btu/ft. • hr.)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	-27.2	-12.7	-8.8	-7.0	-6.0
40	-20.4	-9.5	-6.6	-5.3	-4.5
50	-13.6	-6.4	-4.4	-3.5	-3.0
60	-6.8	-3.2	-2.2	-1.8	-1.5
70	0.0	0.0	0.0	0.0	0.0
80	6.8	3.2	2.2	1.8	1.5
90	13.6	6.4	4.4	3.5	3.0
100	20.4	9.5	6.6	5.3	4.5
110	27.2	12.7	8.8	7.0	6.0
120	34.0	15.9	11.0	8.8	7.5
130	40.8	19.1	13.3	10.5	8.9
140	47.6	22.2	15.5	12.3	10.4
150	54.4	25.4	17.7	14.0	11.9
160	61.2	28.6	19.9	15.8	13.4
170	68.0	31.8	22.1	17.6	14.9
180	74.8	34.9	24.3	19.3	16.4
190	81.6	38.1	26.5	21.1	17.9
200	88.4	41.3	28.7	22.8	19.4

3"	Surface Temperature (°F)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	40.3	59.2	63.9	65.9	67.0
40	47.7	61.9	65.4	66.9	67.7
50	55.2	64.6	66.9	67.9	68.5
60	62.6	67.3	68.5	69.0	69.2
70	70.0	70.0	70.0	70.0	70.0
80	77.4	72.7	71.5	71.0	70.8
90	84.8	75.4	73.1	72.1	71.5
100	92.3	78.1	74.6	73.1	72.3
110	99.7	80.8	76.1	74.1	73.0
120	107.1	83.5	77.7	75.2	73.8
130	114.5	86.2	79.2	76.2	74.6
140	122.0	88.9	80.7	77.2	75.3
150	129.4	91.6	82.3	78.3	76.1
160	136.8	94.3	83.8	79.3	76.8
170	144.2	97.0	85.3	80.3	77.6
180	151.7	99.7	86.9	81.3	78.3
190	159.1	102.4	88.4	82.4	79.1
200	166.5	105.1	89.9	83.4	79.9

1. All calculations based on cylindrical thermal resistance methodology (ASHRAE).
2. Pipe convection set to be 1.00 Btu/hr. • ft^2 • °F (based on standard value for free convection of air).
3. This heat loss comparison uses 0.25 Btu • in./(hr. • ft.^{2} •°F) as the insulation thermal conductivity. This is a standard value for fiberglass pipe insulation at a 100°F/37.8°C mean temperature.

4"	Heat Loss (btu/ft. • hr.)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	-22.4	-12.6	-9.2	-7.5	-6.4
40	-16.8	-9.5	-6.9	-5.6	-4.8
50	-11.2	-6.3	-4.6	-3.7	-3.2
60	-5.6	-3.2	-2.3	-1.9	-1.6
70	0.0	0.0	0.0	0.0	0.0
80	5.6	3.2	2.3	1.9	1.6
90	11.2	6.3	4.6	3.7	3.2
100	16.8	9.5	6.9	5.6	4.8
110	22.4	12.6	9.2	7.5	6.4
120	28.0	15.8	11.5	9.3	8.0
130	33.6	19.0	13.8	11.2	9.6
140	39.2	22.1	16.2	13.1	11.2
150	44.8	25.3	18.5	15.0	12.8
160	50.4	28.4	20.8	16.8	14.4
170	56.0	31.6	23.1	18.7	16.0
180	61.6	34.8	25.4	20.6	17.6
190	67.2	37.9	27.7	22.4	19.2
200	72.8	41.1	30.0	24.3	20.8

4"	Surface Temperature (°F)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	41.1	59.1	63.7	65.7	66.8
40	48.3	61.8	65.3	66.8	67.6
50	55.6	64.6	66.8	67.9	68.4
60	62.8	67.3	68.4	68.9	69.2
70	70.0	70.0	70.0	70.0	70.0
80	77.2	72.7	71.6	71.1	70.8
90	84.4	75.4	73.2	72.1	71.6
100	91.7	78.2	74.7	73.2	72.4
110	98.9	80.9	76.3	74.3	73.2
120	106.1	83.6	77.9	75.4	74.0
130	113.3	86.3	79.5	76.4	74.8
140	120.5	89.0	81.0	77.5	75.6
150	127.8	91.8	82.6	78.6	76.4
160	135.0	94.5	84.2	79.7	77.2
170	142.2	97.2	85.8	80.7	78.0
180	149.4	99.9	87.4	81.8	78.8
190	156.6	102.6	88.9	82.9	79.6
200	163.9	105.3	90.5	84.0	80.4

1. All calculations based on cylindrical thermal resistance methodology (ASHRAE).
2. Pipe convection set to be 1.00 Btu/hr. • ft^2 • °F (based on standard value for free convection of air).
3. This heat loss comparison uses 0.25 Btu • in./(hr. • ft.^{2} •°F) as the insulation thermal conductivity. This is a standard value for fiberglass pipe insulation at a 100°F/37.8°C mean temperature.

6"	Heat Loss (btu/ft. • hr.)				
Water Temperature (°F)	**No Insulation**	**½" Insulation**	**1" Insulation**	**1½" Insulation**	**2" Insulation**
30	-46.6	-21.5	-14.6	-11.3	-9.4
40	-35.0	-16.2	-10.9	-8.5	-7.1
50	-23.3	-10.8	-7.3	-5.7	-4.7
60	-11.7	-5.4	-3.6	-2.8	-2.4
70	0.0	0.0	0.0	0.0	0.0
80	11.7	5.4	3.6	2.8	2.4
90	23.3	10.8	7.3	5.7	4.7
100	35.0	16.2	10.9	8.5	7.1
110	46.6	21.5	14.6	11.3	9.4
120	58.3	26.9	18.2	14.2	11.8
130	69.9	32.3	21.9	17.0	14.1
140	81.6	37.7	25.5	19.8	16.5
150	93.2	43.1	29.2	22.7	18.8
160	104.9	48.5	32.8	25.5	21.2
170	116.5	53.9	36.5	28.3	23.5
180	128.2	59.3	40.1	31.1	25.9
190	139.8	64.6	43.8	34.0	28.2
200	151.5	70.0	47.4	36.8	30.6

6"	Surface Temperature (°F)				
Water Temperature (°F)	**No Insulation**	**½" Insulation**	**1" Insulation**	**1½" Insulation**	**2" Insulation**
30	43.1	59.2	63.5	65.5	66.6
40	49.8	61.9	65.2	66.6	67.5
50	56.6	64.6	66.8	67.8	68.3
60	63.3	67.3	68.4	68.9	69.2
70	70.0	70.0	70.0	70.0	70.0
80	76.7	72.7	71.6	71.1	70.8
90	83.4	75.4	73.2	72.2	71.7
100	90.2	78.1	74.8	73.4	72.5
110	96.9	80.8	76.5	74.5	73.4
120	103.6	83.5	78.1	75.6	74.2
130	110.3	86.2	79.7	76.7	75.1
140	117.0	88.9	81.3	77.9	75.9
150	123.8	91.6	82.9	79.0	76.8
160	130.5	94.3	84.5	80.1	77.6
170	137.2	97.0	86.2	81.2	78.5
180	143.9	99.7	87.8	82.4	79.3
190	150.6	102.4	89.4	83.5	80.2
200	157.3	105.1	91.0	84.6	81.0

1. All calculations based on cylindrical thermal resistance methodology (ASHRAE).
2. Pipe convection set to be 1.00 Btu/hr. • ft^2 • °F (based on standard value for free convection of air).
3. This heat loss comparison uses 0.25 Btu • in./(hr. • ft.^{2} •°F) as the insulation thermal conductivity.
   This is a standard value for fiberglass pipe insulation at a 100°F/37.8°C mean temperature.

8"	Heat Loss (btu/ft. • hr.)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	-57.9	-27.0	-18.2	-14.0	-11.6
40	-43.4	-20.2	-13.6	-10.5	-8.7
50	-28.9	-13.5	-9.1	-7.0	-5.8
60	-14.5	-6.7	-4.5	-3.5	-2.9
70	0.0	0.0	0.0	0.0	0.0
80	14.5	6.7	4.5	3.5	2.9
90	28.9	13.5	9.1	7.0	5.8
100	43.4	20.2	13.6	10.5	8.7
110	57.9	27.0	18.2	14.0	11.6
120	72.3	33.7	22.7	17.5	14.4
130	86.8	40.5	27.3	21.0	17.3
140	101.3	47.2	31.8	24.5	20.2
150	115.8	53.9	36.3	28.0	23.1
160	130.2	60.7	40.9	31.5	26.0
170	144.7	67.4	45.4	35.0	28.9
180	159.2	74.2	50.0	38.5	31.8
190	173.6	80.9	54.5	42.0	34.7
200	188.1	87.7	59.1	45.5	37.6

8"	Surface Temperature (°F)				
Water Temperature (°F)	No Insulation	½" Insulation	1" Insulation	1½" Insulation	2" Insulation
30	44.4	59.3	63.5	65.4	66.5
40	50.8	62.0	65.1	66.5	67.4
50	57.2	64.6	66.7	67.7	68.3
60	63.6	67.3	68.4	68.8	69.1
70	70.0	70.0	70.0	70.0	70.0
80	76.4	72.7	71.6	71.2	70.9
90	82.8	75.4	73.3	72.3	71.7
100	89.2	78.0	74.9	73.5	72.6
110	95.6	80.7	76.5	74.6	73.5
120	102.0	83.4	78.2	75.8	74.4
130	108.4	86.1	79.8	76.9	75.2
140	114.9	88.7	81.4	78.1	76.1
150	121.3	91.4	83.1	79.2	77.0
160	127.7	94.1	84.7	80.4	77.9
170	134.1	96.8	86.3	81.5	78.7
180	140.5	99.4	88.0	82.7	79.6
190	146.9	102.1	89.6	83.8	80.5
200	153.3	104.8	91.2	85.0	81.4

1. All calculations based on cylindrical thermal resistance methodology (ASHRAE).
2. Pipe convection set to be 1.00 Btu/hr. • ft^2 • °F (based on standard value for free convection of air).
3. This heat loss comparison uses 0.25 Btu • in./(hr. • ft.^{2} •°F) as the insulation thermal conductivity. This is a standard value for fiberglass pipe insulation at a 100°F/37.8°C mean temperature.

Appendix F: Formulas and Symbols

Symbols

D = outside diameter of pipe, inches

d = inside diameter of pipe, inches
(average based on mean wall)

t = average wall thickness, inches

P = pressure

PSI S = stress, PSI

Formulas

$A_0 = D \times \pi/12$ = outside pipe surface (ft.²/ft.)

$A_i = d \times \pi/12$ = inside surface (ft.²/ft.)

$A = (D2 - d2) \times \pi/4$ = cross-sectional plastic area (in.²)

$A_f = d2 \times \pi/4$ = cross sectional flow area (in.²)

$W_{pvc} = .632 \times A$ = weight of pipe (lb./ft.)

$W_{cpvc} = .705 \times A$ = weight of pipe (lb./ft.)

$W_w = 0.433\ A_f$ = weight of water filling, lb. per ft. length

$r_g = \surd\ I = A\ D2 + d2\ 4\ \surd$ = radius of gyration, inches

$I = A_{rg}{}^2 = .0491\ (D4 - d4\ )$ = moment of inertia, inches fourth

$Z = 2I/D = 0.0982 \times (D4 - d4\ )/D$ = section modulus, inches cube

$W_{wfp} = W_{pvc}$ (or W_{cpvc}) + W_w = weight of water filled pipe (lb./ft.)

Capacity

$VG = V \times 0.004329$ = Volume capacity (gal./ft.)

$V = 0.7854 \times d2 \times 12$ = Volume capacity (in.³/ft.)

Pressure Rating

$P = 2S/((D_o/t) - 1)$

Notes

Notes

Notes

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