

Aquatherm Technical Bulletin

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Aquatherm Flow Velocities

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One of the great selling points of Aquatherm is the pipe's ability to be used at higher flow velocities than copper or steel.

Typically, the model plumbing codes (UPC, IPC, NSPC, NPC) require design flow rates for non-metallic pipes to not exceed 8 ft./sec. (2.44 m/sec.). This flow velocity was established to avoid noise generation (hissing and singing) water hammer and excessive velocities in fittings where the waterway is reduced. Further velocity restrictions are necessary for metal pipes to avoid erosion – corrosion. Due to the natural noise attenuation of Aquatherm pipe and the natural ability of the pipe to absorb the forces of water hammer, as well as the full-bore diameter of the fittings, we can increase the velocities of the flow in the pipe without compromising the ability of the pipe to prevent noise generation and water hammer.

Aquatherm has published pressure loss and velocity tables to around 15 ft./sec. (4.6 m/sec.).

We also now have codes that allow up to 10 ft./sec. (3.05 m/sec.) for plumbing if the manufacturer recommends it. There is also the possibility of the codes allowing up to 12 ft./sec. (3.66 m/sec.) for plastic piping. This is mainly being driven by the PEX manufacturers.

Aquatherm has allowed engineers to design as high as 15 – 20 ft./sec. (4.57 – 6.10 m/sec.) depending on the job and design. This allowance comes with a caveat to ensure that there will not be any quick-acting valves or other sources of surge pressures in the system. In other words, it is permissible to design to the higher velocities for the pipe material, but the system may not be able to handle the higher velocities in terms of pressure surges, water hammer or noise issues.

One of the advantages to designing with higher velocities is overcoming the decreased volumetric flow rates (GPM) that can result from using a lower velocity with a smaller internal diameter of some Aquatherm pipe dimensions compared to copper and steel.

Aquatherm recommends not exceeding the flow velocity shown in the following table without first consulting Aquatherm.

Pipe Size	Allowable Design Velocity ¹
½" (20mm) – 6" (160 mm)	8 ft./sec. (2.44 m/sec.)
8" (200 mm) – 10" (250 mm)	10 ft./sec. (3.05 m/sec.)
12" (315 mm) – 18" (450 mm)	12 ft./sec. (3.66 m/sec.)
20" (500 mm) – 24" (630 mm)	14 ft./sec. (4.27 m/sec.)



Revisions:

1. 24 January 2023 – Revised table of Allowable Design Velocities to match the Design Guide.