Piping Considerations- Maximum Fluid Velocity

BAC designs its standard evaporative cooling products to limit fluid velocities to approximately 10 ft/s through all piping connections. This generally accepted piping practice is recommended for a variety of reasons:

- **Friction Loss** – Higher fluid velocities increase friction losses (commonly referred to as "pressure drop"), resulting in increased pump energy costs.
- **Noise and Vibration** – Systems designed to current codes minimize excessive noise or vibration when the fluid velocity is held to 10 ft/s or less
- **Erosion/Corrosion**– Fluids at high velocities have a greater propensity to damage the inside walls of pipe. The effect of velocity is increased with chemically aggressive fluids or fluids with a high amount of solids entrained in the fluid stream.
- **Hydraulic Shock**– Also known as "water hammer," hydraulic shock can cause excessive damage upon start-up and shut down. Maintaining a low fluid velocity will substantially reduce the impact of hydraulic shock.

Table 1. Basic Standard Connection Sizes (Outlet/Inlet)

Connection Diameter (in)	Maximum Flow (gpm)	Maximum Fluid Velocity (ft/s)	Connection Diameter (in)	Maximum Flow (gpm)	Maximum Fluid Velocity (ft/s)
3	225	10.2	10	2,300	9.4
4	400	10.2	12	3,200	9.1
6	900	10.2	14	3,700	7.8
8	1,600	10.2	16	4,650	6.7

BAC's Closed Circuit Cooling Tower Selection Software is programmed to automatically select the appropriate quantity and size of entering and leaving process fluid connections, to maintain the limits listed above. Only by specific customer request and acceptance BAC will provide evaporative cooling products designed for higher velocities. Fewer connection points and smaller pipe sizes associated with high fluid velocities may reduce installation costs, but the customer must also consider the increased operating costs and equipment maintenance concerns. Successful operation of BAC's equipment in the system is based on established industry principles.