Use of CPVC Piping Systems with Tankless Heaters

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SCOPE:
This PPFA User Bulletin is designed to provide general guidance for using Chlorinated Polyvinyl Chloride (CPVC) piping systems with residential tankless (instantaneous) water heaters. Specific situations may and often do require special precautions or procedures. Therefore, users should carefully assess each specific situation before making practical application of anything contained in this publication.

CPVC AND RESIDENTIAL TANKLESS WATER HEATERS
Questions have arisen about the use of chlorinated polyvinyl chloride plumbing systems with modern domestic market household demand-type or tankless water heaters. Under normal operating conditions and when governed by and used with adequate safety and control devices, the performance of residential demand-type water heaters can reasonably be expected to be within the range of performance of a properly engineered plumbing system utilizing CPVC plumbing products.

Demand water heaters, also known as tankless or instantaneous water heaters, have been common in Europe, Asia, Central and South America for many years. In the United States they began appearing in the 1970s and have recently become increasingly popular. Unlike conventional or storage tank type water heaters, tankless units heat the incoming water only as needed or “on demand.” This saves the energy that would ordinarily be lost in a traditional tank system during periods of non-use. A tankless water heater is designed to only heat flowing water when a hot water valve is opened in the system. Once activated, the device delivers a constant supply of hot water. Demand water heaters come in a variety of sizes for different applications and can be powered by natural gas, propane, or electricity.

Throughout the world safety control devices for and associated with demand-type water heaters can vary appreciably. The best demand water heaters have the most controlled operation employing temperature limiting devices, pressure limiting devices and water flow-sensing/heater-control devices. These water heaters employ a totally automatic operation based upon a preset water temperature and a minimum water flow through the heater required to activate. A demand water heater having few inadequate, or no safety controls can pose a hazard to the occupant and surrounding environment regardless of pipe material used downstream. On the other hand, it has been shown where these demand water heaters have proper controls and have been properly installed, these heaters can be a safe, efficient, and reliable choice.

The control and limitation of water temperature and pressure supplied to plumbing fixtures is obviously a serious health and safety issue. Code authorities, plumbing engineers, plumbers, and users must understand the methods of protecting against both thermal shock and scalding. In light of these concerns many water heaters in North America are limited to the temperature range of 122 °F to 140°F. This temperature is within the specific range of CPVC materials used in plumbing applications. Temperature and pressure reducing valves are required in North America on the hot water line near the water heater. The standard temperature and pressure limits for these devices are set at 210°F and 150 psi. Regulating bodies within North America require that CPVC plumbing materials demonstrate performance conditions of 210°F and 150 psi for 48 hours. This test condition represents a water heater having a high-level fault in temperature and pressure, and thus regulated by the relief T and P valve, for two days.

CPVC pipe and fitting materials have been used in hot and cold-water plumbing systems in North America since the 1960s and have been used with tankless devices for over 40 years in Europe. Material properties of CPVC plumbing pipe and fittings complement the performance of these water heaters when operating within the controlled parameters of a plumbing system. Furthermore, since the upper temperature/pressure limits of plumbing systems are well within the limits of CPVC pipe and fitting materials there is little chance that CPVC pipe and fitting materials will compromise the overall system.

NOTE:
This PPFA User Bulletin is designed to provide general guidance for the efficient, effective and proper use of plastic pipe. The material contained in this Bulletin are offered solely to provide plastic pipe users with a general frame of reference. Because specific situations can and often do require special treatment, the material herein is not necessarily applicable to any specific situation or application. Therefore, the user should carefully assess the requirements of his specific situation before making practical application of anything contained in this publication.