

# CONTRACTOR

THE NEWSMAGAZINE OF MECHANICAL CONTRACTING

Reprint from August 1994

## The key link component in hydronics: the mixing valve

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THE MIXING VALVE is the key component for any hydronic heating system, separating the boiler from the heat distribution system while controlling the precise Btuh input flowing through the radiation loop into the building structure.

It is the most important means to optimizing fuel efficiency and heating comfort by utilizing the constant circulation concept.

It is a simple and ingenious device which is almost as old as hydronic heating.

In Europe it is as standard as a check valve or a circulator in any system small or large. In this country, it is almost exclusively used on commercial systems. If it makes sense for a large building why not use it for a small residential one?

The off-the-shelf components for a continuous circulation system - mixing valve, actuator and associated controls - compared with necessary intermittent circulation components - multiple circulators, zone valves relays and flow check valves - are only slightly higher in cost, and can pay for themselves within a heating season or two, not to mention the dramatically improved heating comfort.

Why aren't we, as heating contractors, making the mixing valve a standard part of our repertoire if it makes so much sense? Is it the fear of the unknown, in particular the controls attached to it? Well, I have good news for you! The electronic controls available today are extremely reasonably priced, easy to install, and dependable. If they are still too expensive or too technical, go non-electric. Non-electric outdoor reset controls, including actuator heating curve adjuster (ratio setter) and indoor/outdoor capillary sensors are available for less than \$300.

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### How can a mixing valve do its job in a closed loop heating system?

First of all we have to differentiate between a mixing valve and a tempering valve. The tempering valve we are all familiar with is designed for open domestic hot water systems to mix hot DHW water with cold city or well water to protect people from getting scalded.

Substituting a tempering valve for a mixing valve is like using a ball valve in place of a true balancing valve. It was never designed for the job; its restriction and pressure drop are too high and its internal sensing cartridge will peter out after a few years of operation.

A true mixing valve needs an external actuator and water temperature sensor.

### The purpose of a mixing valve in the heating system is two-fold.:

1) To maintain low water temperatures (80°F-140°F), depending on the type of radiation (floor heating, panel radiators, etc.), in the heat distribution loop with a boiler running at 140°F-180°F. (The temperature in the heating loop is dependent upon the indoor/outdoor temperature ratio.) This is done without introducing any cold fresh water into the closed-loop system.

2) To maintain high boiler temperature, to protect the boiler from flue gas condensation and to provide higher water temperatures for other uses like indirect fired water heaters, fan coils or baseboard.

To do this, the pump/circulator must run continuously during the heating season, recirculating the heating water from the radiation system right back into the system supply. The mixing valve will infinitely fine-tune a small amount of radiation water to be directed back to the boiler to be reheated, which means the same

amount of high temperature water flow will be released from the heat source, continuously being injected into the recirculation loop of the radiation system.

It is a constant balancing act of the mixing valve to reset itself and subsequently the system water temperature to inject just enough hot boiler water to make up for the instantaneous heat loss of the building. It's like cruise control on your car

What can be more efficient than heating low temperature system return water back up from 100°F-105°F or from 135°F-140°F rather than intermittent blasts of 180°F? Through use of a mixing valve, boiler cycling is reduced to a minimum and the results are guaranteed to be dramatic: Fuel reductions of 20%-30%, with heating comfort levels your customer won't believe!

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