

Water Glass Tutorial

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Author: [LarryDoyle](#)

The water glass is an important appliance on a steam locomotive, so much so that a minimum of two water glasses are now required in the cab of locomotives.

The principle of a water glass is shown in the follow diagram. A glass tube, surrounded by a shield to protect the crew in case of breakage, is connected to the backhead so that the bottom of the glass is a minimum of 3 inches above the highest point of the crown sheet of the firebox. Most are 4 to 6 inches higher than that, and one glass may be mounted higher than the other

Three valves control the water glass. The lowest, 1 on the drawing, is a drain connected to a pipe which vents to the atmosphere below the cab floor, and is normally closed when the boiler is in service. Valve number 2 connected to the boiler at the bottom of the glass, below the waterline. The top valve, number 3, is connected to the top of the glass and to a copper pipe which extends to the top of the boiler. Valves 2 and 3 are normally open when in service.

The reason for the long copper pipe is so that steam entering the glass from the top of the boiler will be partially cooled on its way to the glass, resulting in a constant flow of condensate from the top of the glass which cleans the glass, prevents corrosion of the glass by dry steam, and show that the glass is functioning properly.

Every crew member in the cab should train themselves to glance at the water glass every 15 seconds or less. The things to check for are:

Is the water level observable, and in the safe range for operation?

Is the water moving in the glass? Motion of the engine and agitation of the circulating water will cause to water level in the glass to be constantly bouncing, at least slightly, if the glass is functioning properly.

Is the water clean? With a constant source of condensate into the top of the glass there should be only clear water in the glass, no matter how much dirt or scale the boiler water may have accumulated since its last boiler wash. Brown or milky water in the glass indicates not only that the glass is malfunctioning, but that the boiler has dirty water.

If the glass appears to be malfunctioning, it must receive immediate attention to determine the cause and find a remedy.

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