

Mixed Bed Unit Distributor Analysis

The best way to check out the distributors is with the mixed bed vessel empty.

UNDERDRAIN

To check the underdrain, put about one foot of water in the bottom of the vessel and turn the air on. Observe the pattern of air bubbles coming out of the underdrain. The pattern should be even with air coming out of all the laterals throughout the tank. There should not be any signs of excessive air bubbling out in one area, with no bubbles in other areas. If the bubble pattern is not even, the underdrain may need to be modified.

The underdrain laterals should be flat on the bottom of the vessel with less than 1/2" clearance, otherwise there will be unregenerated resin at the bottom which does not get mixed up and will contribute to leakage during the service cycle. The holes in the underdrain laterals should point downward to help promote good mixing of any resin which can hide out below the laterals.

INTERFACE COLLECTOR

Look at the interface collector. It should be level and should evenly cover the entire tank with the laterals within 6" of the vessel wall. If there is a way to bring water into the interface, the water flow pattern can be observed. The water should dribble (not spray) out of the laterals at a flow rate equal to the acid plus caustic dilution water rates and should come out evenly across the entire vessel. Examine the screens for signs of wear. The holes in the interface laterals should point sideways, not up or down.

CAUSTIC DISTRIBUTOR

Not all mixed beds have a caustic distributor. In smaller units (4 ft. diameter and less) it is quite common to bring the caustic in through the upper distributor. The practice wastes an excessive amount of water in large units but does not create any major operating problems.

To check the caustic distributor, turn on the caustic dilution water (do not turn on the caustic pump) and look at the flow pattern. The water should come out of the holes in the laterals about 6"-12" and then fall down into the bottom of the vessel. The streams of water should all come out sideways and should cover the inside of the tank evenly without spraying out and hitting the edge of the tank.

UPPER DISTRIBUTOR

One of the best ways to check the upper distributor is with the vessel full of resin and water and the mixed bed in service at maximum flow. Look at the resin bed through the viewport. If there is resin swirling around or if the bed is uneven with bunching of resin in one corner or a crater in the center, this is a sign of poor distribution.

The upper distributor should be symmetrical so that the water will flow out evenly. It really doesn't matter whether the flow comes out upward, downward or sideways, as long as it doesn't create so much turbulence that the resin bed is distributed. In high flow rate units (over 20 gpm/sq. ft.) it may be necessary to use a coarse screen or other type of baffle to reduce the turbulence.

