Minimizing Control Valve Hysteresis (Dead Band)

AVCO Control Valves are designed with dead band in mind and there are many factors which can affect the valve dead band, but many of these are out of our control; especially if we only provide the valve and not associated actuation. The biggest factors are the build-up of clearance fits between accessory couplers, the rack and pinion fit, correctly sized actuators, actual available air (for pneumatic), correct selection based upon Cv, amongst other factors.

The AVCO valve itself is designed to minimize backlash with very close clearances between moving parts based upon the ISO limits and fits system. If supplied, we also design our couplers based upon the ISO limits and fits system for close clearances. Where possible we recommend V30 and below Vee balls as these give much better control. They need to move a greater percentage of rotation in order to change the flow by the same amount, thus preventing the 'jumping' or 'sticking' of the ball affecting the flow due to initial breaking torque, which can be an issue with certain valve seat combinations. This is demonstrated more clearly in the graph below, where the flatter the curve, the better the control; although this affects the range of the valve (for the same size) and could be a slightly higher initial outlay as the valve size would need to be larger. For example a 2" V30 could be a better option than a 1 ¼" V60 as control would be more precise, but the 2" valve is a higher outlay. There is a tendency in the market to install a smaller valve in a line for control due to cost and winning orders, but this can defeat the purpose and does not always give what the customer needs.

Our preference is to always provide complete valve assemblies and be involved in the sizing to give the customer a suitable total package.

