



Damper Control Considerations

ACTUATOR SIZING:

Selection of actuator size cannot simply be made on calculated torque requirements only- practical common sense must also apply. Manufacturers typically provide damper torque requirements based on bushing friction & seating requirements. For on/off services these figures are factored based on the ΔP across the valve in the shut position. For modulating figures are factored based on the ΔP across the valve shut position. For modulating services a dynamic torque figure is included in calculations based on the ΔP across the valve for various disc angles. Calculation data for the above is accurate for determining torque requirements, however should not be used solely for determining actuator size.

Our experience is that many automation facilities select actuators based on on/off calculated torque only. Rarely do they consider dynamic torque and disc dynamics. The outcome is relatively small actuator capable of turning the valve, but that does not perform well in service. Dynamic torque must be considered in all damper applications. Additionally, one must consider the physics of the disc in rotation. Disc weight and momentum especially in dampers without seats or travel stops (swing thru types) can be critical. This can have a detrimental effect on the actuator at ends of travel.

When selecting an actuator we recommend the following:

- 1) Apply a safety factor of 2 to 3 times maximum calculated torque.
- 2) Utilize an actuator with an input shaft this is equal to or greater than that of the valve shaft diameter.
- 3) Select actuator accessories, such as solenoid valves and positioners with flow capacities that will limit stroking speed of the valve. Speed controls should be provided piped to the actuator outputs.

MODULATING SERVICES:

Dynamic forces across the disc must be accounted for and can be substantially greater than bushing torque and seating torque. The effect of dynamic torque can be critical if the disc modulates in the 50-70 degree range. Force across the disc shifts from tending to close to tending to open in this area of rotation which can have a major effect on the ability of the actuator hold position. Positioners must be used and should be tuned to the actuator. Popular rotary positioners which work well on ball, plug, and resilient seated butterfly valves are typically high capacity models. Higher air delivery and gain attributes of these positions can have a detrimental effect when used with dampers. Dampers tuning friction is very low and a slight change in position pressure to the actuator can cause a large change in position. This is especially true with double acting actuators which can oscillate severely. Use of the spring

return actuators will help dampen this effect, but are not the complete solution. The key is to limit air flow delivery to actuator.

Continued...

In selecting an actuator and positioner for modulating service we recommend:

1. Avoid the use of undersized actuators which require small air volume.
2. Use spring return actuators on critical services.
3. Provide speed controls on output ports from positioner to actuator.
Use of speed controls rather than needle valves is recommended. Speed control valves have integral check valves which limit flow in one direction and allow full metered flow in the other.

Questions... please do not hesitate to call.

Kent Stump

10/01/2001

TELLTALE AUTOMATION EQUIPMENT, INC.

