



The Secret Life of Valves - BBBB (Buy)

Control Valve Handbook

By Fisher

Reviewed by Nick Sands

Control valves have long been the most common way to manipulate a process. And long ago, in 1965, Fisher Controls published the first edition of the *Control Valve Handbook*. The small black book has become a classic companion to many an automation engineer. It has been updated several times. This review is on the second edition.

The first chapter covers the parts of a control valve. Excellent diagrams provide a clear indication of each part; from the globe valve stem to the butt weld on the flange. There are also clear definitions for each term. This chapter is one of the highlights of the book. Next is a chapter on positioners and boosters. Again there are excellent diagrams. In the second edition, positioners were still discouraged except in the most demanding applications.

The chapter on control valve selection explains the equations and parameters for control valve sizing, starting with $Q = C_v \sqrt{\Delta P / G}$. For liquids the key limitations are flashing and cavitations. Flashing occurs when the pressure at the lowest point, the vena contracta, is less than the vapor pressure of the liquid at the boiling point. Cavitation occurs when the valve pressure recovery causes the flashed vapor bubbles to collapse destructively. For gasses, the key limitations are critical flow at sonic velocity and noise. Once the pressure drop has reached critical flow, any additional decrease in downstream pressure will not increase flow, though an increase in upstream pressure will. Beyond sizing there is guidance on material selection based on corrosion and temperature limitations.

The chapter on special control valves details some special applications, which include high pressures up to 50,000 psig, high temperatures up to 1500 deg F, and low temperatures below -150 deg F. These valves use special materials, body designs, and actuators to perform in difficult conditions.

A section on maintenance includes tips on the replacement of the valve seat and guidance on tightening valve packing, one of the largest causes of valve leaks. The final chapters are filled with an amazing collection of data; conversion constants, steam tables, physical properties for chemicals, and pipe data, just to list a few.

An understanding of control valve selection and application is a basic skill for most automation engineers. The *Control Valve Handbook* has become one of the most popular references for this subject. Fisher performed a great service to the industry when they wrote and distributed the handbook. The 4th edition is available in hardcover for ~\$70 at Amazon.com or available for free download at ControlGlobal.com. It is a book worth buying (BBBB) either way.