

TECHNICAL BRIEFS

ENGINEERING DEVELOPMENTS HERE AND
ABROAD DIGESTED FOR BUSY POWER MEN

REVIEWED IN THIS ISSUE

VALVES AND PIPES

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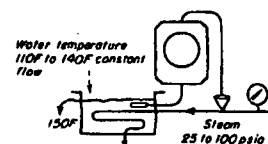
Fuel Oil in the Steel Industry
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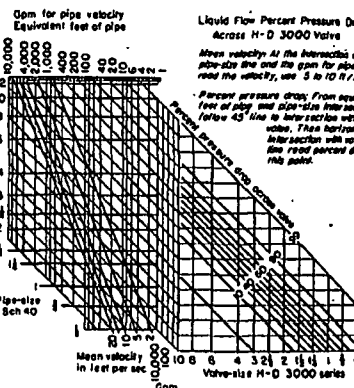
Rust Preventives Maintain Steel
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Directions for ordering papers are given on page 130



Linear valve	4F	4F	1F	1F
Equal % valve	4F	1F	4F	1F
Water	110F	140F	110F	140F
Steam	100 psia		25 psia	

- 1 Comparison between the linear and equal percentage valves shows on a load where water changes 30 F and steam 75 psia
- 2 Network chart helps size valves where flow rate, velocity, viscosity, specific gravity, equivalent pipe length are known



VALVES AND PIPES

VALVE CHARACTERISTICS AND PROCESS CONTROL, by N B Nichols and J G Ziegler, Taylor Instrument Co's. This discussion of various valves tells how their characteristics fit them for process control. Included are ratio, throttle, V-notch and beveled-disk types. For instance, the so-called poppet valve is of single- or double-seated beveled-disk design. Their nature—globe valves with sliding stems instead of a threaded, hand-operated stem—permits easy use with automatic controls. But this class of valve has essentially a linear flow-lift characteristic; its effective opening area increases in almost direct proportion to the lift of the valve from the seat.

Ideal control for all processes is not necessarily linear so this valve class is limited to those processes where pure linear control applies. A second valve class, one with an equal percentage

characteristic, draws its name from the fact that the valve disk is so shaped that a given lift at any opening increases effective opening area a fixed proportion of the total existing. A comparison of these valves is shown in Fig. 1.

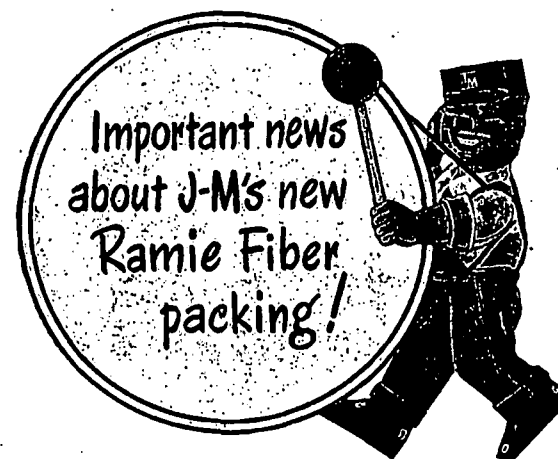
A gas-fired oil heater—one sample process of many selected by the authors—maintains a constant outlet-oil temperature by operating a valve in a fuel gas line to the burners. From an analysis of this process and the others, the authors formulate a general rule on valve selection. In brief, these rules make up a simple guide for determining the most desirable control valve for a given application.

Valve characteristics can be overlooked if (1) controller sensitivity is high (2) period of oscillation is short (3) maximum range of load is less than two to one.

An "equal percentage valve" does not apply if (1) controlled medium carries

solid particles or will deposit scale (2) maximum load range is greater than about eight to one (3) major load change calls for a linear valve (4) valve lag accounts for most of effective process lag. ISA Paper No. 48-2-1.

LIQUID FLOW CHARACTERISTICS OF A PIPE LINE AND A CONTROL VALVE, by Otto Kneisel, Hammel-Dahl Co. Sizing of all control valves by slide rules or alignment charts, based on pressure drop across them, disregards the characteristics of the line in which the valve is to be installed. This paper sets up a network chart to solve any specific control-valve problem in a liquid-flow system requiring pipe size, valve size, pressure drop across the line and across the valve, flow rangeability and flow characteristics. Basic data necessary for a starting point are: (1) flow rate, gpm (2) specific gravity of liquid involved (3) viscosity (4) equivalent length of



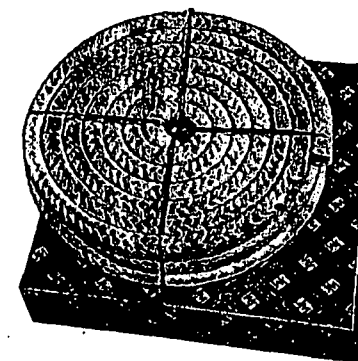
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