

TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

Engineering No. 17

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Pressure Relief Valve Selection

All Wyoming Engineering standards for pipelines require the installation of pressure relief valves if there is a possibility of damaging surges occurring. Wyoming Technical Note, Engineering No. 12 explains a procedure for sizing and locating pressure relief valves.

The demand for irrigation pipelines is ever increasing. As a consequence, numerous manufacturer's are marketing spring operated pressure relief valves. In many instances, the sizing of the valves is misleading, as the port opening is much smaller than the valve size. Wyoming Engineering Standards require the manufactures of pressure relief valves to provide capacity tables. Realizing that due to the time element, such requirements may be difficult to administer, the attached charts will assist in evaluating various models of pressure relief valves. As other discharge capabilities become available, they will be added to the charts.

The designer should consider the possibility of a variation in materials from which the spring was fabricated. Pressures required to discharge the required flows may be five pounds per square inch higher than those shown by the attached charts. The designer should be conservative in selecting a size and model of valve.

For design purposes, the velocity through any spring loaded pressure relief valve is limited to ten (10) feet per second. Based on this velocity limitation, the flow through various sized valves is as follows:

<u>Valve Diameter (inches)</u>	<u>Flow in GPM</u>
3	220
4	392
6	883

The valve of the charts can best be explained by examples:

Example 1: Low head, 50 foot head PVC pipe used in design. Pressure relief valve required to discharge 200 gpm. Valve setting: 16 psi. Select type of valve to be specified on the drawings or in the specifications.

Solution: From chart for three inch valves, Waterman Model AA-9, set at 16 psi, will discharge 200 gpm when pressure reaches 20 psi. Waterman Model AA-6 will require a pressure of 28 psi before it will discharge 200 gpm. The pressure rating of the pipe is 21.7 psi - design would require the use of a Waterman Model AA-9 or equal.

Example 2: Fifty (50) psi PVC pipe used in design. Pressure relief valve required to discharge 200 gpm. Valve setting 30 psi. Select type of valve to be specified on drawings or in the specifications.

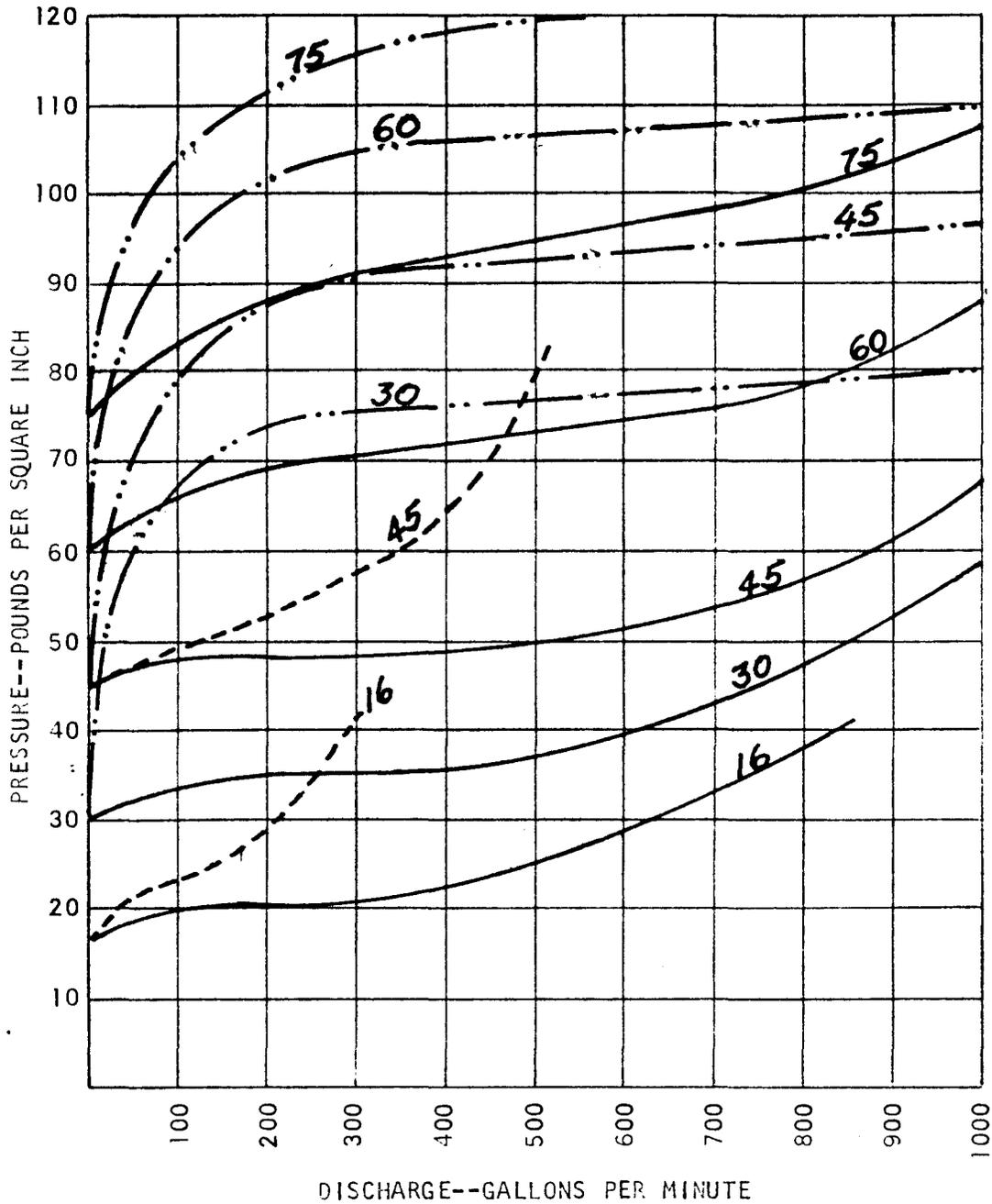
Solution: Use chart for 3 inch diameter valves. Waterman Model AA-9 valve will discharge 200 gpm when pressure reaches 35 psi. Waterman Model AA-6 valve, by interpolation, will discharge 200 gpm when the pressure reaches 41± psi. The Tri-action valve will discharge 200 gpm when the pressure reaches 74 psi. The pressure rating of the pipe is 50 psi. For economic reasons, specify the use of a Waterman Model AA-6 or equal.

Example 3: One hundred (100) psi PVC pipe used in design. Pressure relief valve or valves required to discharge 780 gpm. Valve setting 90 psi. Select valve or valves required.

Solution: Use chart for 4 inch diameter valves. Two (2) each. Waterman AA-9 valves will discharge 780 gpm (390 gpm each valve), when pressure reaches 107 psi. Use chart for 6 inch diameter valves. One 6 inch valve will discharge 790 gpm when pressure reaches 98 psi. Select one Waterman, 6 inch, Model AA-9 or equal.

From the charts, it is apparent that all pressure relief valves do not have the same capability. Do not approve a valve without first obtaining test results from the manufacturer. (Test results for Waterman valves and Tri-action valves are shown on the attached charts. Additional test results will not be required.)

THREE (3) INCH DIA. PRESSURE RELIEF VALVES



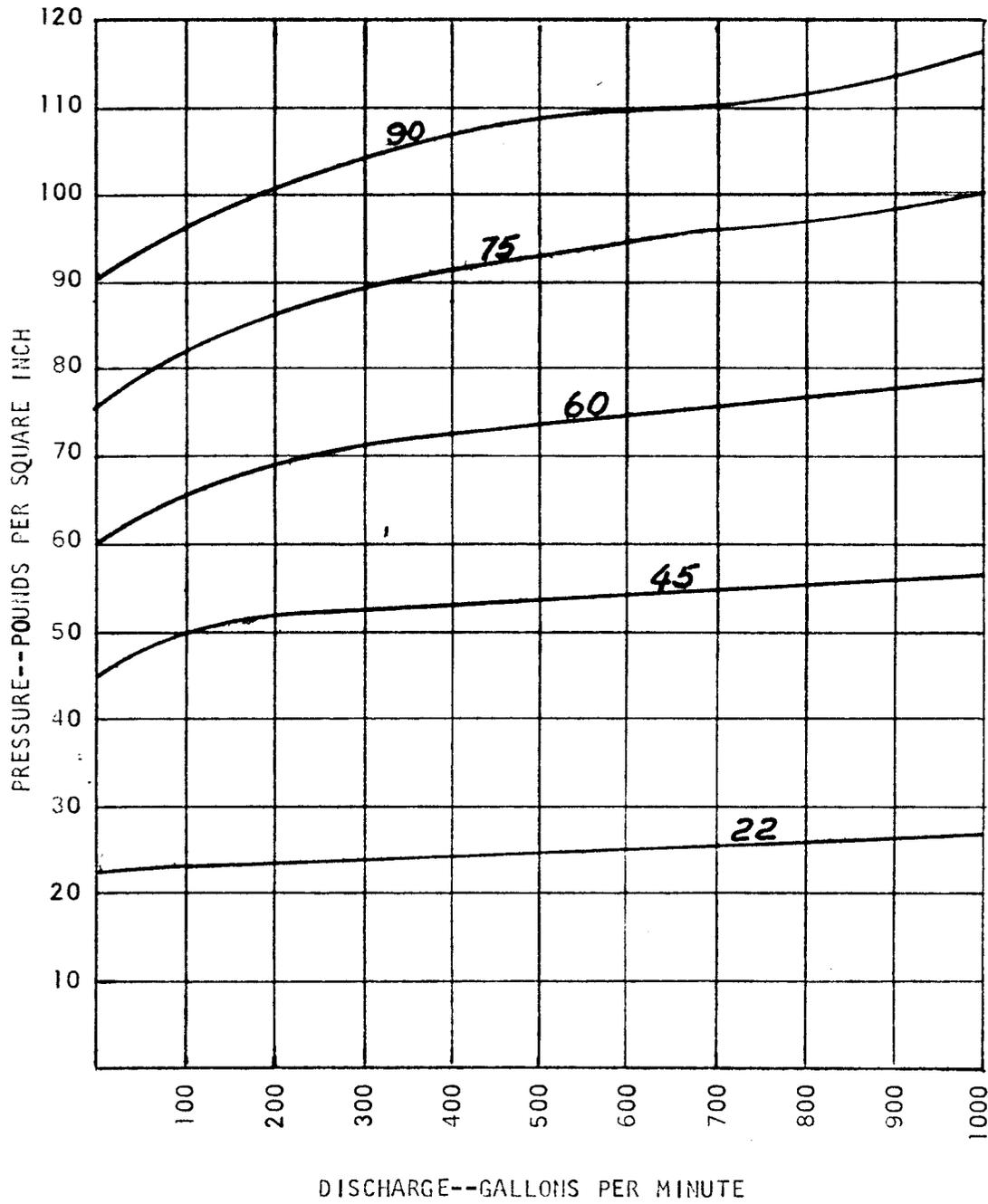
16-30 etc Pressure setting of Valve (Set to open)

————— Waterman, Model AA 9

- - - - - Waterman, Model AA 6

- · - · - · - Tri-Action Irrigation Valve

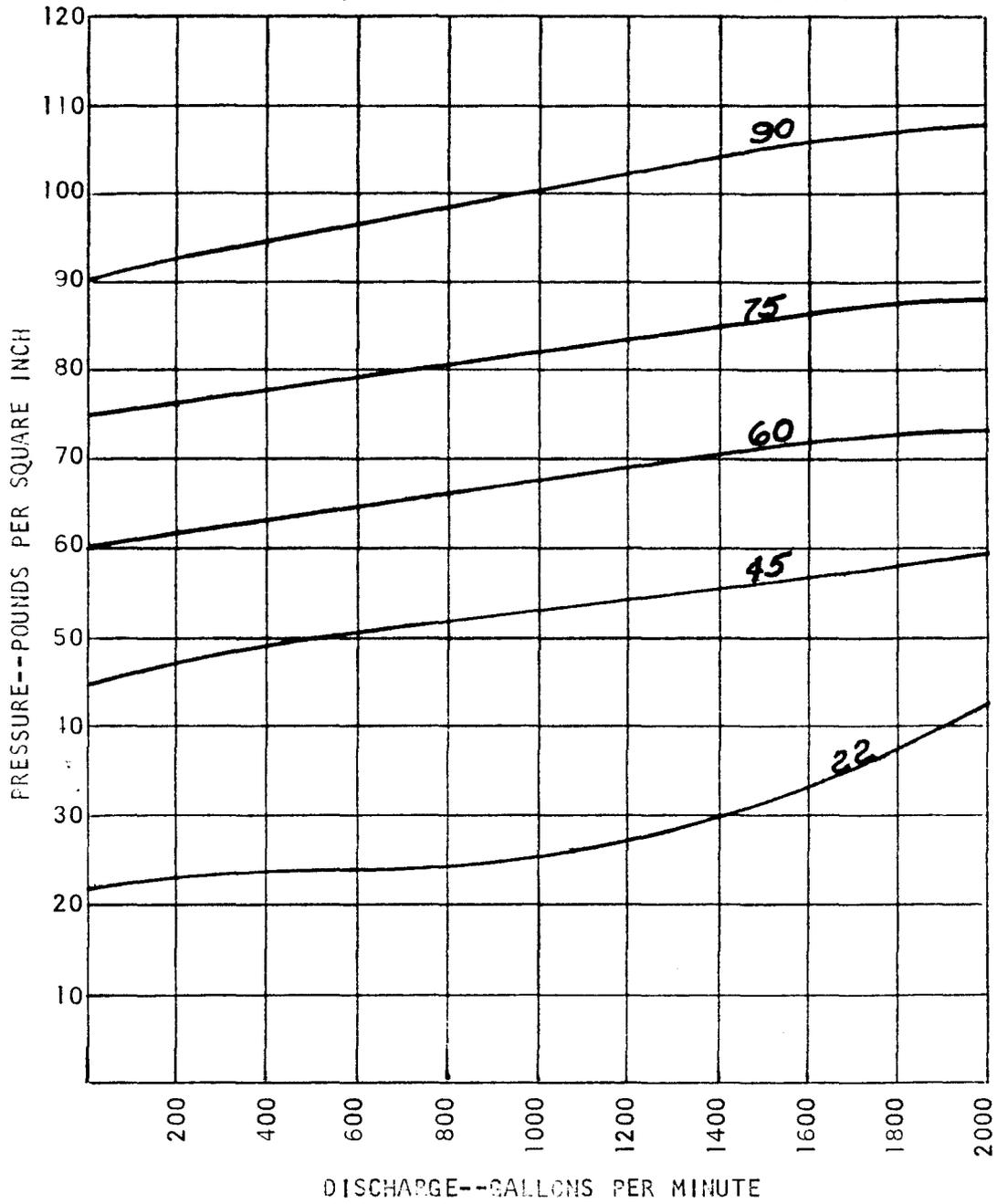
FOUR (4) INCH DIA. PRESSURE RELIEF VALVES



22-45 etc. Pressure setting of Valve (Set to open)

————— Waterman Model AA9

SIX (6) INCH DIA. PRESSURE RELIEF VALVES



22-45 etc. Pressure setting of Valve (Set to open)

— Waterman Model AA9