

OPERATING PRINCIPLES

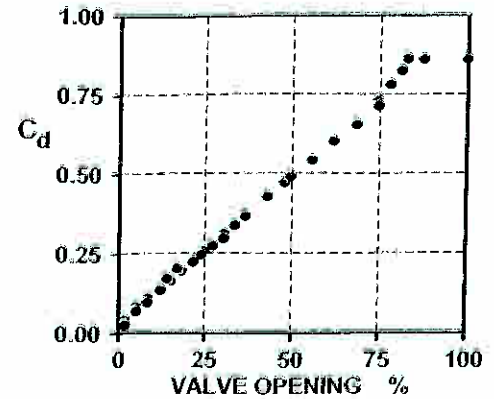
Hartman Fixed Cone Valves

The Hartman Model 117 Fixed Cone Valve is a free-discharge valve commonly used as a turbine bypass valve, reservoir drain, or continuous discharge flow control valve. The Hartman Fixed Cone Valve operates cavitation and vibration free through its entire operating range, and has excellent flow control even during the first 10% of stroke.

The Hartman Model 117 Fixed Cone Valve has a fixed cone with a hydrodynamically advanced shape, supported by four vanes designed to eliminate vibration and flutter. Flow is controlled by movement of an external stainless steel sleeve which has a drip tight metal to metal shut off against the fixed cone.

When discharging into the atmosphere, the jet spreads out in a wide cone angle and breaks up into a fine spray. If containment of the jet is desired, a hood can be installed which not only allows for aerating the water, but also concentrates the flow, much like the jet from a needle valve.

The Hartman Model 117 Fixed Cone Valve has been independently tested. Results of the testing showed that there was no significant mechanical vibration, and at the extreme open position, the discharge coefficient was 0.86, both with and without a hood. In addition, the valve had an almost linear variation of flow coefficient with stroke, even during the first 10% of stroke.



Discharge coefficient versus valve opening (reference: Tullis, J.P. "Report of Utah State University Foundation," Hydraulic Report No. 216).



A 54-inch Hartman Fixed Cone Valve operating in the almost closed position, discharging 1 cfs. Note the fully circular flow.



A Hartman Model 117 Fixed Cone Valve with hood provides containment of the jet, while discharging 1100 cfs.

A 54-inch Hartman Fixed Cone Valve, without hood, is shown operating in the partially open position. Flow rate can be calculated from:

$$Q = C_d \times (2gH)^{1/2} \times A$$

Where:

Q = Flow in cfs

C_d = Discharge Coefficient
(.86 max)

A = Crosssectional Area on the ID

g = 32.17 ft/s²

H = Upstream Head in ft.

