



VALVE SIZING GRAVITY FLOW

Frequently, PEBCO® is asked what flow rate might be expected from a given size valve. Unfortunately, an accurate answer to this question cannot be given, since material-related properties and the characteristics of the bin, in addition to the opening size, are the primary factors determining the flow rate.

A review of literature on the topic indicates that under certain conditions (mass flow bins) the flow rate can be computed with a reasonable degree of accuracy. In the case of plug flow bins, the outlet is sized to prevent piping or doming of the stored material rather than flow rate. In any case, the calculations are complex and involve many factors relating to the material and bin characteristics. As a further source on this subject, "Storage and Flow of Solids", by A. W. Jenike, University of Utah Engineering Experiment Station, Bulletin No. 123, is recommended.

It is realized that project deadlines frequently do not afford the luxury of detailed calculations on each system component, and that in such instances, approximations with appropriately generous safety factors become the rational choice. **The chart on the bottom of this correspondence lists flow rates based upon near optimum conditions for a straight gravity drop.** Allowances should be made to compensate for less than ideal bin design or for materials that do not possess good flowability. Also, for diverter valves, where the material changes direction, use a flow rate of 1/3 of the capacity shown on the chart.

VALVE SIZING GRAVITY FLOW @ 50 lb/ft³

Valve Size	Round (cfm)	Square (cfm)	Round (tph)	Square (tph)
6"	13	16	19	24
8"	30	38	45	57
10"	59	75	86	110
12"	98	125	145	185
14"	149	190	224	285
16"	220	280	330	420
18"	306	390	455	580
24"	659	840	989	1,260
30"	1,178	1,500	1,727	2,200
36"	1,884	2,400	2,826	3,600
48"	4,318	5,500	6,437	8,200
60"	7,065	9,000	10,598	13,500

In order to prevent plugging of the valve, the size of the valve should be at least:
10 times the average material size . . . OR . . . 4 times the largest lump size


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