ROTARY AIRLOCK FEEDERS

How to Select and Size an Airlock

Choosing the proper type of rotary airlock feeder depends on many factors, including:

- The size and displacement required
- The valve's intended function (airlock, feeder, or both)
- Pressure and temperature of your application
- The characteristics of the product being handled

Sizing

Proper size depends on the volumetric capacity required and the physical dimensions of the opening to which the airlock will attach.

The chart on the right lists volumetric capacities for Prater Airlocks, assuming 80% pocket fill efficiency.

In practice, pocket filling can vary depending on certain application variables:

- Dense, fluidized, free-flowing powders (can result in 90-100% pocket fill)
- Lighter density, sluggish powders (can result in 60-80% pocket fill)
- Pressure differential across the valve, moving countercurrent to product flow (can reduce pocket fill efficiency to as little as 50%)

To determine the displacement required for your application, divide rate (lbs/ hr) by product density (lbs/ cu ft).

Sizing Example

If a valve is required to move 38,000 lbs/ hr of sugar with a bulk density of 55 lbs/ cu ft, the displacement would be:

(35,000 lbs/hr ÷ 55 lbs/ cu ft = 636 cu ft/ hr)

VOLUMETRIC CAPACITIES @ 80% POCKET FILL									
MODEL	6"	8"	10"	12"	14"	16"	1420	1824	2830
C.F.R	0.12	0.24	0.42	0.76	1.18	1.84	1.04	2.40	7.76
VALVE RPM	DISPLACEMENT IN CUBIC FEET/ HR								
5	36	72	126	228	354	552	312	720	2328
6	43	86	151	274	425	662	374	864	2794
7	50	101	176	319	496	773	437	1008	3259
8	58	115	202	365	566	883	499	1152	3725
9	65	130	227	410	637	994	562	1296	4190
10	72	144	252	456	708	1104	624	1440	4656
11	79	158	277	502	779	1214	686	1584	5122
12	86	173	302	547	850	1325	749	1728	5587
13	94	187	328	593	920	1435	811	1872	6053
14	101	202	353	638	991	1546	874	2016	6518
15	108	216	378	684	1062	1656	936	2160	6984
16	115	230	403	730	1133	1766	998	2304	7450
17	122	245	428	775	1204	1877	1061	2448	7915
18	130	259	454	821	1274	1987	1123	2592	8381
19	137	274	479	866	1345	2098	1186	2736	8846
20	144	288	504	912	1416	2208	1248	2880	9312

Solution

In this application, a 12" airlock at 14 RPM or a 14" airlock at 9 RPM will work.

The larger 14" airlock would permit better mass flow of product whereas the 12" airlock might be selected based on economy, smaller height/ footprint, and higher operating speed.

Note: For feeding applications, 10-15 RPM typically provides the most uniform discharge of product at the greatest fill efficiency.

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