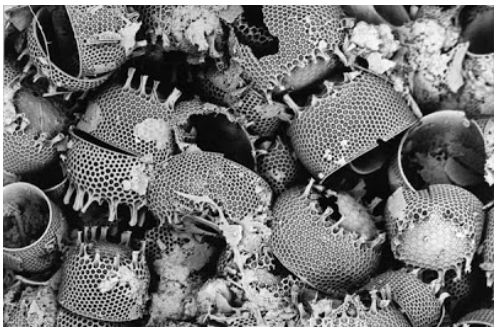
STURTEVANT
SINCE 1883

Whirlwind & SuperFine Air Classifier

Air Classification of Diatomaceous Earth

APPLICATION BULLETIN

BACKGROUND/ CHALLENGE



Diatomaceous Earth (DE) is a fine powder made from the fossilized remains of aquatic organisms called diatoms whose skeletons are made of a natural substance called silica. DE is used for filtration of swimming pools, beverages, toothpaste, and many more applications. First, contaminates including silica sand and trace minerals have to be carefully removed from DE without damaging its porous composition and hollow-shaped microstructure. The value of the final product depends on the microporosity, purity and particle size distribution of the powder.

A producer of DE needed to find a way to remove the majority of contaminates from their diatomaceous earth powder. The impurities, predominately silica sand, heavy trace minerals and glassy particles formed during the calcining process, needed to be removed without causing damage to the fragile DE which is comprised of the fossil remains of diatoms. In addition, the manufacturer wanted to be as efficient as possible by recovering as much of the DE from the deposit with minimal DE losses.

STURTEVANT® PERFORMANCE

For the initial stage of the process, Sturtevant supplied a Whirlwind Air Classifier. This classifier was very effective at making a rough cut of approximately 60-80 micron with 85-90% DE recovery. The classifier also helped disperse any agglomerated lumps of DE, further contributing to the efficiency of the process.

The second stage of the process required an air classifier that could make a much finer separation of 45 microns and capture DE with a bulk density of only 5-10 lbs/cu ft. For this duty, Sturtevant supplied a Superfine Air Classifier. This model has a multi-blade rejecter cage with very small open spaces and operates at a high tip speed that allows the ultra-fine, ultra-light DE particles to pass through, while rejecting the oversize contaminants. DE recovery rates again exceeded 90%.

Due to the abrasiveness of silica-base DE, Sturtevant provided ceramic wear protection parts for the Superfine Air Classifier. Since DE has a low bulk density, Sturtevant also provided an oversized product/dust collector and oversized rotary airlock valves which allowed for a full collection of the processed DE.

EQUIPMENT RECOMMENDATIONS

WHIRLWIND® AIR CLASSIFIER

MODEL	HP	AIR FLOW VENT (CFM)	FEED RATE (TPH)
20”	5 – 7.5	25 – 50	0.5-1
3’	7.5 – 10	65 – 125	2-5
4.5’	10 – 15	75 – 150	5-10
6’	15 - 25	90 - 175	10-20
8’	20 - 30	150 - 300	20-40
10’	30 - 40	190 - 375	30-60
12’	40 - 50	275 - 550	40-90
14’	50 - 75	400- 800	50-120
16’	100 - 150	675 - 1,350	90-200

Larger sizes are available, for a complete list see the Whirlwind Air Classifier Product Bulletin.

SUPERFINE AIR CLASSIFIER

MODEL	HP	AIR FLOW VENT (CFM)	FEED RATE (LBS. PER HOUR)
36”	10 – 20	3,000	1,000 - 10,000
72”	25 – 50	9,000	10,000 - 30,000

SUMMARY

With the two step air classification process in place, the diatomaceous earth producer was able to achieve their desired bulk density with high recovery rates as the majority of their product was not damaged despite its fragile nature. With the help of Sturtevant, the producer saw a higher profit margin given the increase in product recovered after going through the two air classifiers.

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