PENNWALT CORPORATION

BULLETIN 1300

SHARPLES® POLYMIZER™ CENTRIFUGES

Our latest innovation in cost-effective sludge dewatering.

Sharples® POLYMIZER™ centrifuges offer those involved in the design, construction, and operation of wastewater treatment plants the *optimum* method for dewatering a wide variety of sludges.

Compare these three methods of dewatering wastewater sludges.

1. Vacuum Filtration System

Advantages

- Produces a reasonably dry cake.
- Produces a clear filtrate.

Disadvantages

- Widely variable filtration rates.
- High installed cost.
- Large space requirements.
- Thickened sludge required.
- Odor problems.
- Skilled workers needed to operate.
- High chemical cost.
- Cloth rinse required.
- Filter cloth replacement.
- System consumes high energy.

2. Centrifugation System

Advantages

- Produces a dry cake and clear centrate.
- Minimum space requirements.
- Low installed cost.
- Simple installation.
- Odor contained.
- Easy to operate.
- Simple start-up and shutdown.
- Highly flexible — handles a wide variety of sludges.

Disadvantages

- Abrasive wear.
- Noisy operation.
- High power requirements.

The POLYMIZER centrifuge has been designed to minimize these disadvantages. See details in this brochure.

3. Filter Press System

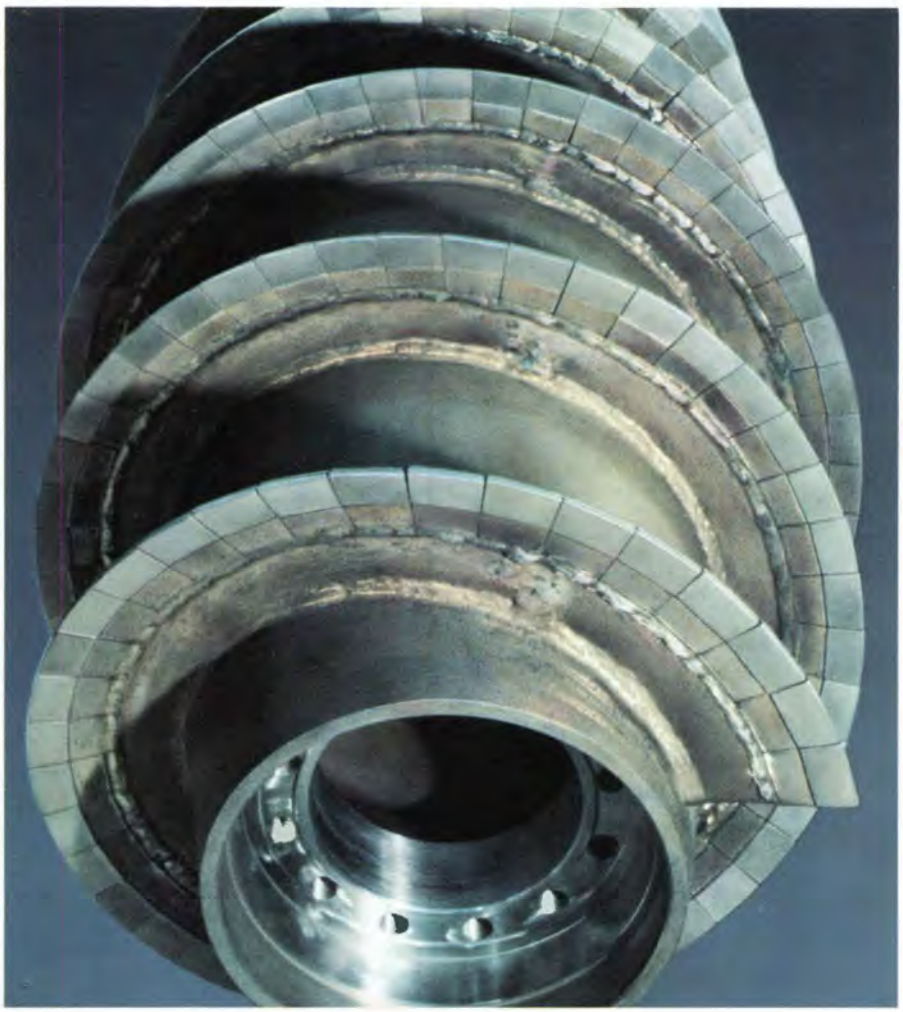
Advantages

- Produces a dry cake.
- Produces a clear filtrate.

Disadvantages

- Large, multi-level installation.
- Large and complex support system.
- Filter cloth replacement.
- High installed cost.
- High labor cost.
- High chemical consumption.
- Skilled workers needed to operate.
- Batch operation.
- Complex start-up and shutdown.

Over 100 Sharples centrifuges have been equipped with our sintered tungsten carbide hard surfacing system since 1975. Not one has required resurfacing due to abrasive wear.



Results from these installations, handling many different types of abrasive feeds, substantiate our own R and D efforts . . . that sintered tungsten carbide is superior to sprayed tungsten carbide, ceramics, and other hard surfacing materials when subjected to low-stress scratch abrasion.

This photo shows two of our sintered tungsten carbide tiles — the one on the right is brand new, the one on the left was removed from the conveyor of the test centrifuge after three months use. It shows polish, but no wear.

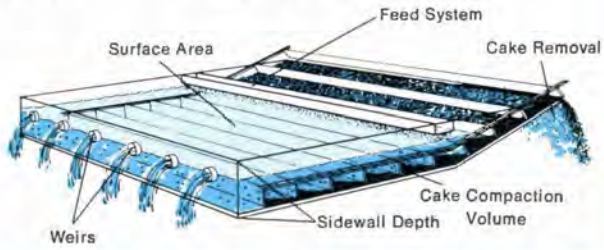
This photo shows the same Sharples conveyor after 15 months of operation. The tiles show little or no wear along the entire length of the conveyor.

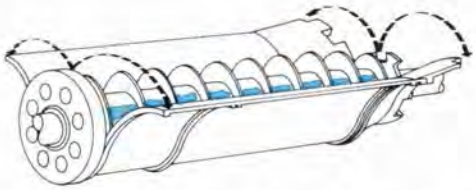
What's new about POLYMIZER centrifuges?

We've refined the basic centrifuge working elements — which are like a clarifier — to take full advantage of surface area, detention time, weir design, and other factors.

Here's how we achieved dramatic improvement in reducing the overall cost of a disposable cake.

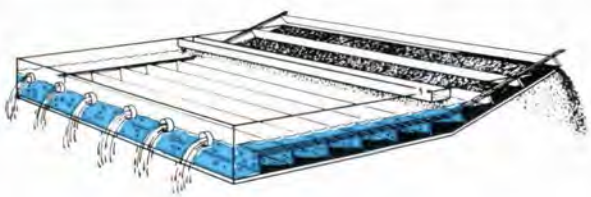
THE CLARIFIER PRINCIPLE

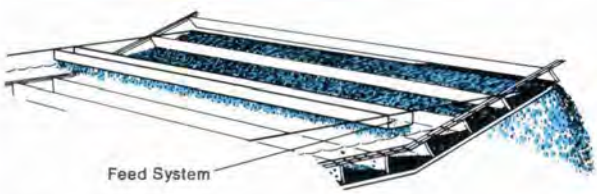




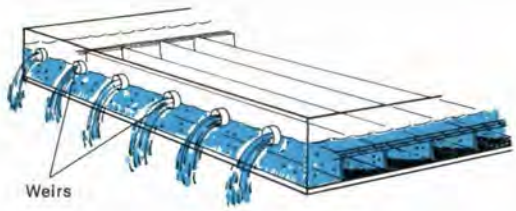
A centrifuge has the same basic characteristics as a clarifier. It's a clarifier whose base is wrapped around a center line so that it can be rotated to generate Gs.

Viewing the centrifuge as a clarifier, we concentrated on the following design improvements.

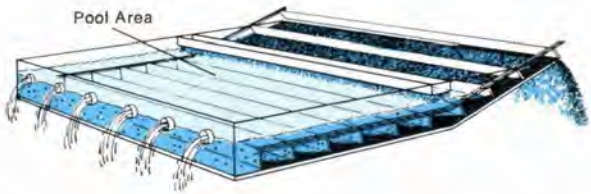




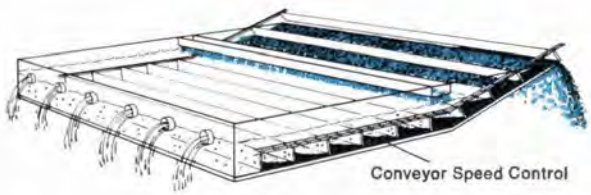
We modified the *feed system* to minimize floc breakage and turbulence in the bowl.



And we redesigned the overflow weirs to materially reduce turbulence at the liquid overflow.



We optimized the *pool area to pool volume* ratio.



We installed an *eddy current brake,* as standard equipment, to control conveyor speed (i.e. cake removal rate) and make full use of the solids compaction volume.

The result is POLYMIZER centrifuges with very low polymer requirements, very high overflow rates (gpm/sq. ft.), and greatly increased cake drying capability.

Stainless steel keeps centrifuges running long after carbon steel has rusted away.

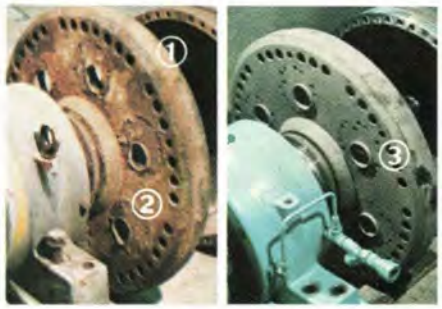
The unretouched photographs on this page are dramatic evidence of the superiority of stainless steel over carbon steel in the construction of centrifuges for wastewater applications.

Both of these Sharples centrifuges were used in wastewater applications for the same length of time — approximately four years.

The part-by-part comparison emphasizes a fact which cannot be ignored — carbon steel plus water add up to rust. And rust leads to loss of metal, unbalance, high maintenance costs, and downtime.

We think too highly of your reputation — and ours — to recommend anything other than stainless steel for sludge dewatering applications.

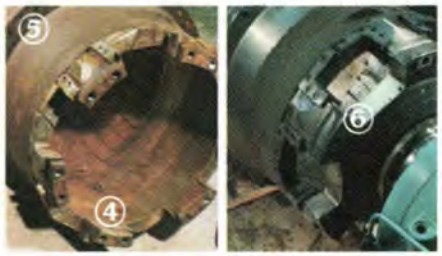
Dismantled centrifuges compare the condition of two centrifuges used for four years in the dewatering of wastewater treatment sludges. The stainless steel shows little or no deterioration. The carbon steel unit is ready for the scrap pile.



(1) With carbon steel, corrosion changed dimensional tolerances on shell and hub causing machine unbalance, rough running, and premature bearing failure.

(2) Removal of corroded screws was difficult and time consuming — many had to be drilled out.

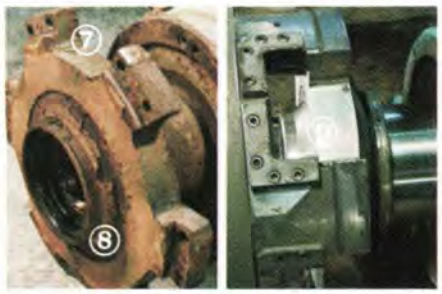
(3) None of these effects are present in the stainless steel centrifuge.



(4) In the carbon steel centrifuge, corrosion products of the bowl interior have been washed away by the movement of liquids and solids.

(5) Rust caused severe disassembly problems.

(6) The carbide tiled beach area in the stainless centrifuge is totally unaffected.

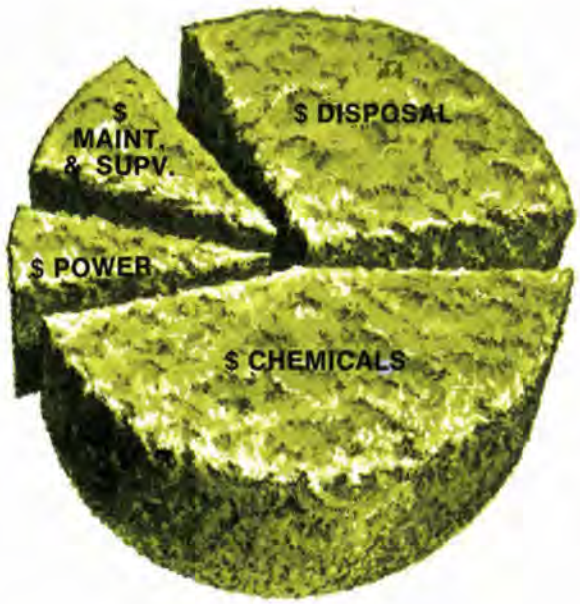


(7) In the carbon steel hub, critical pilot diameters and mating surfaces corroded causing unbalance, vibration, and general mechanical deterioration.

(8) The bearing holder rusted in place, causing more disassembly problems.

(9) The stainless steel centrifuge is still like new.

POLYMIZER centrifuges are engineered to produce a disposable cake at minimum cost.



POLYMIZER centrifuges can significantly reduce the installed cost of a sludge dewatering station, because of their high capacity and simple installation requirements.

Of more importance, is the ability of the POLYMIZER centrifuge to produce a disposable cake with low cost for chemicals, disposal, power, maintenance, and supervision.

If we divided a *disposable* cake into segments by major cost factors, it would look like this:

Chemicals. Usually the most expensive segment of the sludge dewatering operation. Even a small difference in usage has a big cost effect over a year's operation. And, the *extra* premium continues for the life of the operation.

Sharples POLYMIZER centrifuges are named for their ability to get maximum flocculation from every pound of polymer.

Disposal. A large cost item directly related to how effective the polydose is. The wetter the cake, the more truck loads you must carry to landfill. The wetness of cake is also important if the cake is to be incinerated.

POLYMIZER centrifuges use polymer effectively for both clarification and dewatering. They dry out the sludge to levels unmatched by competitive centrifuges.

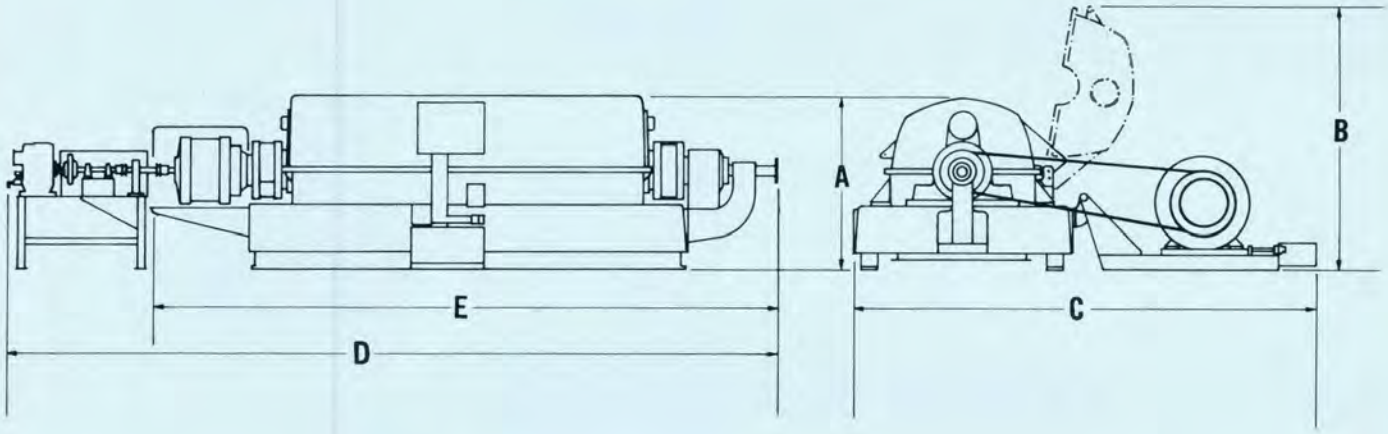
Power. All centrifuges require energy to develop centrifugal force. A minimum of power is required for basic separation of solids and liquids. Throughput and the nature of the feed determine the speed and the need for additional power. Regardless of the speed required, power cost is a small portion of the overall cost of sludge dewatering.

POLYMIZER centrifuges operate through a range of speeds and G forces, the correct combination being determined by all of the other requirements for cake dryness and disposal.

Maintenance. The most elusive segment of dewatering costs. All centrifuges require some maintenance during their operating life — whether preventive or the result of wear and failure. The best way to avoid excessive maintenance costs is to install first quality equipment.

The difference is technology, and POLYMIZER centrifuges take advantage of the latest advances — with rugged construction, stainless steel components, and sintered tungsten carbide hard surfacing system. Longevity and low maintenance are a matter of record in innumerable Sharples centrifuge installations throughout the United States.

Basic Specifications of POLYMIZER Centrifuges



Side View

End View

Model	Connected Motor Horsepower	Centrifugal Force (range in G's)	Height (in.)		Width** (in.) C	Length (in.)		Approx. Weight*** (lb.)
			Casing Closed A	Casing Open B		With Eddy Current Brake D	Without Eddy Current Brake E	
PM-20000	10-25	1000-2500	34	51	76	98	73	2000
PM-30000	20-40	1000-2500	38	54	76	116	92	2500
PM-35000	20-50	1000-2500	39	55	76	116	92	3100
PM-40000	50-75	1000-2500	42	64*	104	171	146	6000
PM-50000	60-75	1000-2500	42	64*	107	204	176	7400
PM-55000	60-100	1000-2500	44	67*	107	204		9000
PM-60000	75-125	1000-2500	48	74*	140	199	165	11,700
PM-70000	75-125	1000-2500	48	74*	140	224	190	13,400
PM-75000	75-150	1000-2500	51	79	140	224	190	16,100
PM-80000	75-150	1000-2300	45	69	126	237	194	15,500
PM-95000	125-200	1000-2000	69	110	165	300	260	34,000

Specifications subject to change without notice.
*Casing cover not hinged. Dimension shown is vertical height of upper cover to clear adjacent machine.
**Without lube system.
***Without drive motor and back drive.

Consider POLYMIZER centrifuges early in your plans.

For a wide variety of sludge dewatering situations. Start with a telephone call to one of our experienced engineering and sales representatives. Ask him to arrange an on-site test. Or a visit to an operating Performance Center. See the back cover for the telephone number of the representative nearest to you.

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