Direct Discharge™ Disk Filter

Thickens pulp for consistent paper stock.

Optimal stock thickening and water return.
Direct Discharge Disk Filter

System Applications
The Direct Discharge Disk Filter is a pulp thickening device typically found at the end of the pulping cycle. Thickening and creating precise fiber pulp mats for any pulp application, along with clean water recovery, are achieved with this low power unit.

Features & Benefits
- **Stable operation** – Stable operation is due to a “direct discharge” allowing for large, thickened, ridged fiber mats to directly enter discharge chutes with no folding required. This results in a more stable operation and no build-up on the chutes that could lead to damaged disks.

- **More drying time** – The vacuum zone is extended on this unit to maximize water reclaim resulting in increased capacity per disk. In many cases, the unit can be operated faster than conventional filters for increased capacity.

- **Small footprint** – This unit has a smaller footprint than those of the competition which allows the disk filter to be potentially installed anywhere in the mill.

The Direct Discharge Disk Filter (DDDF) is a pulp thickening device that removes water from a pulp slurry. The pulp slurry is fed to the disk filter at approximately 1% consistency and is discharged at 10%. The disk filter's main advantage over other dewatering equipment is that it retains most of the fibers. Very clear filtrate means that the water can be returned up-front in the previous steps without carrying fibers that have already gone through the process.

On a conventional disk filter, the pulp discharges on the same side as the pulp enters the machine. The thick pulp accumulated on the disk surface has to pass between the feed chute and in some cases the disk filter sector gets damaged in that zone. On the DDDF, the thick pulp on the disk does not need to pass between the feed chute. It goes out of the vat on the opposite side from the feed where there is no restriction.

- **Valve features** – Bridges are adjustable to fine-tune the quality of the water resulting in clear and cloudy filtrate splits.

- **Rapid release dismounting of disk sectors** – Mountings are easily adjustable and replaceable. (Each unit has 20 sectors per disk).

- **Quality filtration and water recycle/reclaim** – Units have cloudy and clear flow streams with the water quality being driven by the application.
How it works

Basic system operation
The disk filter consists of a series of disks perpendicular to a center shaft. The center shaft is horizontal and turns inside a vat at speeds between 1 and 3 rotations per minute. The speed depends on the pulp characteristics. The number of disks depends on the production rate required from the machine and of the type of pulp. Each of the 20 sectors is connected to an individual channel on the center shaft. Each of the individual channels are isolated from one another so water cannot flow from one channel to the other.

A filtrate valve located at one end of the shaft lets the filtrate flow out of the center shaft channels. The filtrate valve has three different zones. The first zone is connected to the atmosphere, the second to a self-generated vacuum and the third is blank. In the atmospheric section each sector gets filled with water as it enters the pulp in the vat. The air in the sector and center shaft channel is replaced with filtrate as the sector gradually enters the pulp in the vat. A pulp mat starts to accumulate on top of the sector surface during that time. The water extracted on the atmospheric side of the valve is called "cloudy filtrate" (cloudy because there are some fibers in the water).

The filtrate valve is designed to stop the flow of water in the center shaft channel and to isolate the channel once the sector is completely submerged by the pulp slurry and the center shaft filled with water. As the center shaft continues to rotate, the channel gets to the vacuum zone of the filtrate valve. In the vacuum zone, a vacuum force pulls the filtrate out of the center shaft and disk sectors to extract water from the pulp slurry. The water extracted on the vacuum side of the valve is called "clear filtrate" (clear because there are very few fibers in the water). As the pulp mat on the top of the sector thickens, the mat catches more and more of the fiber so only water is removed.

The vacuum is applied on the pulp mat for a short period after it comes out of the pulp slurry to drain as much water out of the pulp. Once the sector is emptied of water, the filtrate valve isolates the center shaft channel from the vacuum zone preventing air to enter the vacuum zone.

- Conventional components arranged in a new way
- Directional flow improves mat formation
- Disk rotates away from chutes
- No chute interference
- More drying time
Once the vacuum is cut, the sector comes to a knock-off shower. The shower lifts the pulp mat on the sector surface and breaks the residual vacuum in the sector completely. The pulp mat then falls directly into the thick stock chute and drops to a re-pulper conveyor. The position of the knock-off shower is critical to releasing the pulp mat at the right time.

High-pressure cleaning showers clean the sector surface after the pulp mat is released and the cycle starts again.

A 5.2 m 2-Disk Pilot Installation Direct Discharge Disk Filter is available for performance demonstration on any kind of pulp. Contact Kadant for more information regarding a demo.

About Kadant

For more than a century, Kadant subsidiaries have been delivering smart and efficient solutions to process industries. As a global leader in fiber processing, fluid handling, water management, and doctoring systems, we design and manufacture products used in industries ranging from paper to plastics and textiles to tires.

At Kadant, we are proud to offer innovative products and technologies that help reduce energy consumption, improve water management, and enhance efficiencies for long-term sustainability. Kadant brand products and services are sold to industries worldwide through our subsidiaries located in more than 18 countries. Our approach is simple: know our customers, understand their process, and use our specialized expertise to deliver the right solutions.