

Bray Extends Valve Life by 4x in Demanding Recycle Pulp & Paper Application

KEY RESULTS

- > 4 to 6 times longer valve life compared to the previous solution.
- > Zero gate, seat, or packing failures after 12 months in service.
- > Significant reduction in downtime and maintenance costs.



Bray Series 942 Recycle/Reject Vortex Knife Gate valve.

APPLICATION

In the recycled paper industry, a cyclone/junk trap is positioned immediately after the pulper. Its primary function is to remove heavy, non-fibrous contaminants from the pulp slurry before it moves on to the screens and cleaners. As wastepaper is broken down into a slurry in the pulper, it often contains foreign materials, such as staples, glass, stones, plastic fragments, or metal bits. These materials, if not removed, can damage downstream machinery and reduce the efficiency and quality of the recycling process.

The cyclone/junk trap works by utilizing gravity and centrifugal force to separate these heavy contaminants. As the slurry flows into the trap, the velocity is reduced—allowing heavier particles to sink to the bottom of the chamber. Meanwhile, the pulp slurry, which contains the usable paper fibers, continues to be screened and cleaned further. The junk collected at the bottom of the trap is then periodically discharged through automated knife gate valves. By removing these unwanted materials early in the process, the junk trap helps protect equipment, minimize downtime, and improve the overall quality of the recycled paper product.

CHALLENGE

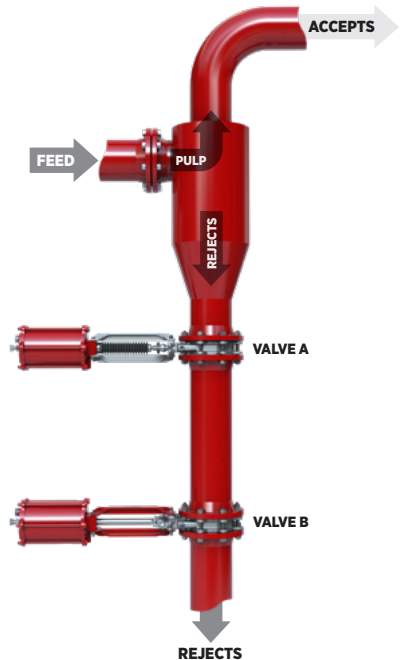
The customer had a long history of valve failures in their cyclone/junk trap applications, having tried several solutions from various suppliers with little success. Due to severe wear on the gate and bore, valves were leaking, jamming, and in some cases completely failing, resulting in frequent unplanned shutdowns. Maintenance teams were forced to intervene multiple times a week, often in hard-to-access areas—causing significant downtime, safety concerns, and rising operational costs.

The customer was skeptical that any new product could solve the problem. When Bray approached them, they were open about the ongoing issues, but hesitant to invest time in yet another trial. By focusing the conversation on the specific challenges in their cyclone process, Bray was able to demonstrate a deeper understanding of the application. This led to a site visit, where the team saw firsthand the extent of the issues—including packing leaks, seat failures, and even gates worn through from erosion.

PROCESS CONDITIONS

| | |
|------------------------|--|
| Industry | Pulp & Paper |
| Challenges | High Cycle, High Wear, Harsh Process Environment, High Vibration |
| Application | Junk Traps / Cyclones / HD & MC Cleaners |
| Media | Rejects: Sand, glass, metal, wax, etc. |
| Issues | Gate Erosion, Packing Leakage, Valve Jamming from Rejects Build-Up |
| Sizes Installed | NPS 6, 8 DN 150, 200 |

CYCLONE/JUNK TRAPS



SOLUTION

Combining both technical and commercial strengths, Bray introduced the Series 942 Knife Gate Valve—specifically designed in collaboration with recycle paper mills for cyclone applications. The valve had already been successfully installed in similar services at other mills around the world, giving the customer added confidence in the solution.

Testing Highlights:

- > Accelerated cycle test over 50,000 cycles to check wear and tear of components, as well as leakage from gland packing and actuator seals.
- > FEA used to determine topworks geometry that is self supporting in high vibration applications.
- > Vibration tested in all directions, with no loosening of bolts or fatigue.
- > Field-tested at multiple recycle paper mills in similar applications.

Beyond performance, Bray had the product in stock and ready to ship. With a short delivery window, the valve was delivered in time for the customer's planned shutdown—helping meet a critical deadline.

Product Highlights:

- > 17-4 PH hardened gate to provide superior wear resistance.
- > High chrome iron vortex breaker to disrupt cyclonic flow and protect the gate from abrasion.
- > Rounded gate edge to improve durability in high-cycle operation.
- > Heavy duty live-loaded 4-layer packing with copper scraper that removes debris from the gate during operation.
- > Backing ring ensures gate alignment throughout full stroke.
- > PTFE dampers in clevis absorb vibration and reduce actuator stress.
- > Dual-piston rod seal actuator specifically engineered for extended high-cycle service.*
- > High strength B8M SS bolts, Nylock nuts, and Nord-Lock washers* specifically engineered for high cycle vibration environments.
- > Purge ports in both the seat and chest areas provide thorough flushing during valve cycling.
- > Propriety Tungsten Carbide Coated body bore to reduce valve body wear.

NOTE

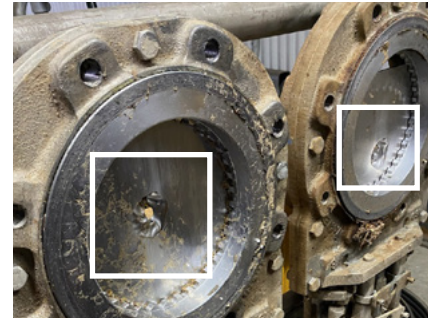
* Select features were updated after the initial trial valve installation, reflecting Bray's commitment to continuous improvement based on real-world application feedback.

RESULTS

Bray Series 942 valves have delivered more than 12 months of continuous operation, compared to 2 to 3 months with the previous valves. This has resulted in:

- > Major reduction in maintenance labor and costs.
- > Greater uptime and reliability in cyclone operation.
- > Elimination of leaks at the seat, gate, and packing.
- > Improved safety and cleanliness in the surrounding area.
- > Stronger partnership between Bray and the plant operations team.

To learn more about our full line of flow control solutions, visit [BRAY.com](https://www.bray.com)



Gate erosion.



Body and packing leaks.



Bray Series 942 Recycle/Reject Vortex Knife Gate valve in cyclone service.