

HEC Case History

Clarkson Valve-Precipitation Circuit-Alumina Industry

The alumina industry has used a device known as a “swing blind” to isolate piping in several areas of the Bayer process for many years. A swing blind is a line sized steel plate that slips between two flanges and provides a secure, absolute shutoff to the pipeline, allowing zero downstream flow or leakage. It is used to isolate pumps for maintenance, tanks for cleaning, and to provide a fail proof way to insure that no flow through the piping is possible.

The problems with this technology are apparent. Large diameter blinds of 16” to 20” require at least two operators and several hours of laborious work with large heavy sledgehammers. It is a dangerous, time-consuming task that has many opportunities for injury. The piping carries hot caustic liquids that form scale, and the “swinging” of the blinds from open to closed or back is a task that no one looks forward to performing.



The Clarkson knife gate valve is a robust, heavy isolation valve designed for the most difficult slurry applications. The valve utilizes opposing steel reinforced elastomer sleeves, which actually form the pressure vessel and protect the frame and body from contact with the material in the pipeline. The sleeves are under a predetermined degree of compression, which forms the most abrasion resistant material available in contact with the slurry. When the valve is in the open position, the nose of the two sleeves are in contact, forming a 360 degree seal and the before mentioned, line sized pressure vessel. The valve gate is completely out of the flow and is poised outside the top of the sleeves, waiting to be called into service. When the valve is in the closed position, the sleeves are in contact with each side of the gate, again forming a 360-degree, bubble tight seal, which provides the same type of isolating effect as the steel plate of the swing blind. The gate in the closed position travels completely through the lower part of the sleeves, therefore it has absolutely no chance of downstream leakage.



Coupled with the fact that an air actuated valve closes at a rate of one inch per second, it is obvious that the use of a Clarkson knife gate valve offers the alumina industry a safer alternative to the swing blind. The use of the air-actuated valve adapts extremely well to the automated process controls in use today. The valve can be actuated via the control room and offer the plant a safe, leak free option to the long used manual swing blind, and a quick and trouble free open or shut pipeline with no safety concerns.

Hunter Equipment Company successfully put in service over 300 of the Clarkson knife gate valves in this service over the past 8 years. The installations have improved the safety, reliability, and modernization of the alumina plants in which they are working.