

CASE STUDY

ESD for critical applications in a refinery



Prelude

Microfinish Valves Pvt Ltd. recently supplied several Emergency Shutdown (ESD) systems to a refinery in Eastern India for the booster & tail gas compressors. The ESD's were 4" (DN 100), 6" (DN 150) & 8" (DN200) sizes, class 300, full port, trunnion mounted ball valves with 10" extended bonnet for fire proof jacket of actuator and accessories .

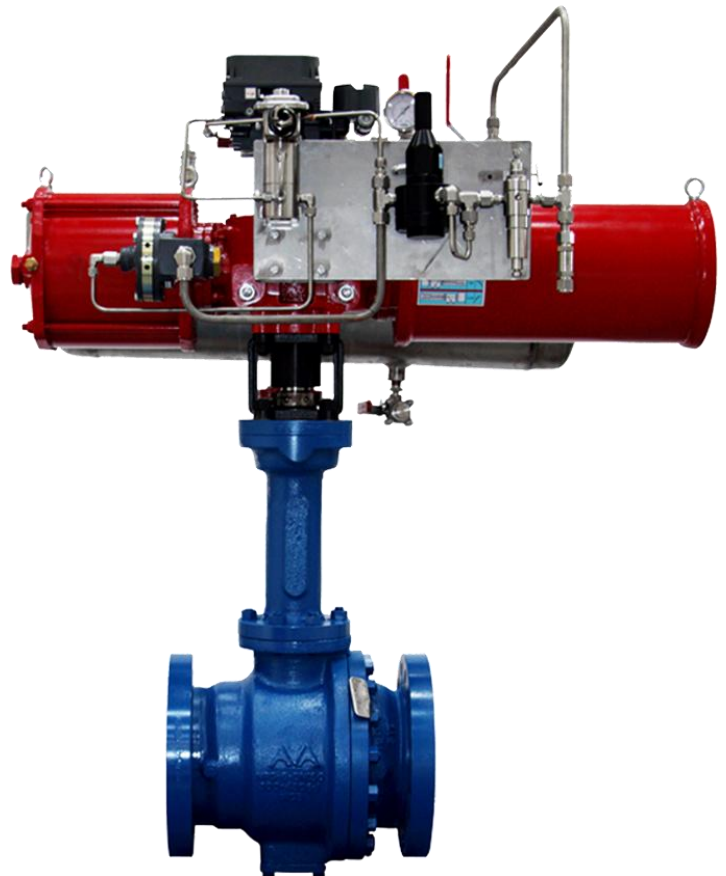
The complete automated packages included a scotch-yoke spring return actuator, Solenoid Valve, Air Filter Regulator, Limit Switches, Positioner and Air Lock Relay, as well as, an integral 100 litre stainless steel compressed air accumulator assembled with Non Return Valve, Pressure Relief Valve, Pressure Gauge and Pressure Switch.

The challenge

As per site safety specifications the ESD systems are designed to shut-off the line in less than 1 second. This is a critical factor because the refinery is subject to a major safety issue in the event the ESD does not operate in this time frame. System reliability is an essential element of the ESDs as they will stay in their armed position most of their life time and only in the case of an emergency must stroke the valve rapidly to its closed position.

To ensure that valve moves to the fail safe position on demand, a Positioner is provided which can be programmed to do the Partial Stroke testing (PST) in predefined intervals. Based on the results of PST, the health of the valve can be assessed and remedial actions can be initiated. The ESD's are certified to work in a SIL 3 loop which means that

for low demand operation the Probability of Failure on Demand (PFD) should be between 0.001 - 0.0001, in other words, as a minimum, out of 1,000 demands for immediate closing 999 events will end up successfully.



8" (DN200) ESD after calibration and testing

- Fire proof jacket allows safe operation for 30 min. at 1000°C
- Rapid closing time in less than 1 sec.
- 100 litre integral compressed air tank, avoids dangerous unintentional operation
- Partial Stroke Test (PST) device included for system reliability check
- Fire safe certified to API 607 and ISO 10497
- Certified to work in a SIL 3 loop

The automation package was equipped with a fire proof jacket, allowing the ESD to function properly at temperatures as high as 1000°C for a duration of 30 minutes.

The result

The complete ESD systems were designed, assembled and meticulously tested at Microfinish valves facility. In the event of a main header air failure, the ESD is designed to remain in the last position, preventing a dangerous unintentional operation. The air accumulator is sized to allow two fully open/close cycles in case the system is disconnected from the main header.

These distinctive ESD systems are another solution from Microfinish valves and our desire to enhance the reliability and safety in the refining industry.



8" (DN200) ESD with fire proof jacket



MICROFINISH VALVES

QUALITY YOU CAN TRUST

MICROFINISH VALVES, INC.

7807 Bluff Point Drive, Suite 190

Houston, Texas 77086

Phone: +1-281-885-4250

sales@microfinishvalvesinc.com

MICROFINISH VALVES PVT. LTD.

B 161-162, Industrial Estate, Gokul Road,

Hubli - 580030, Karnataka, India.

Phone: +91-836-2212404, 2210611

sales@microfinishgroup.com