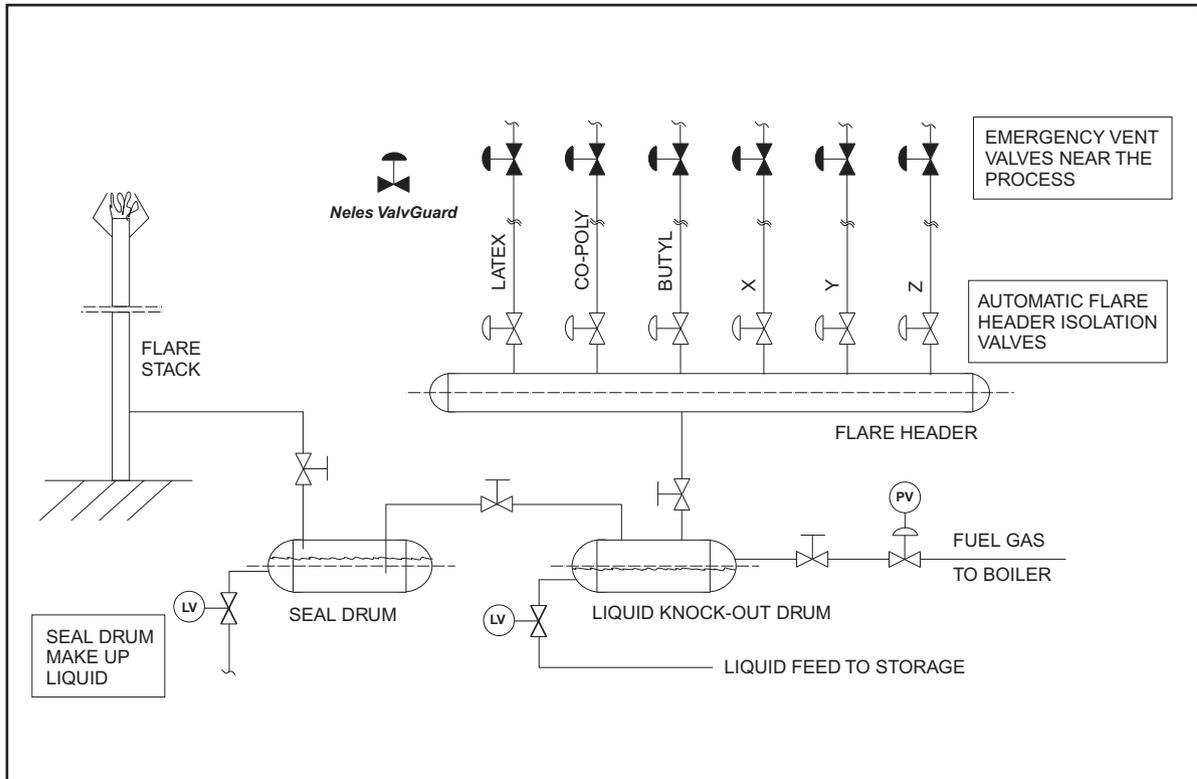


# Gas to Flare System ESV & ESD Valves



## Flare system

Potential hazards associated with petrochemical industries are explosions, fires, and releases of toxic substances.

Flares are designed for the proper disposal of emergency-released gas, liquids, or waste. In petrochemical plants, flares are typically mounted on a tall stack to move the venting away from immediate plant areas and processes.

The height of the stack is important to the safety of the surroundings and personnel. The diameter is important to provide sufficient flow velocity to allow the vapors or gases to leave the top of the stack at sufficient velocities to provide good

mixing and dilution after ignition at the flare tip by pilot flames. Discharge velocity usually exceeds 150 m/s (500 ft./s).

The flare system consists of several different components depending on the plant and the process. Picture above shows one simplified configuration.

The unit should have back-up instrumentation to ensure liquid level control to dispose of the waste-recovered liquid. The seal tank is a physical, liquid seal to prevent the possibility of backlash from the flare backing into the process manifolds. It is essential for every stack design.

## ESD & ESV valves in gas to flare system

Both ESD and ESV valves are commonly located in or near the process plant. The flows from different processes are further lead to a flare header which is sized for the certain worst-case volume condition, assuming that relief devices discharge at the same time and other process vents may also be flowing.

The ESV (Emergency System Vent) valves are normally closed letting the process continue normally and preventing the expensive media from flowing to flare and burning to waste. In an emergency situation, when part of the process or the whole process goes down or does not continue to work normally, the production is sent to flare via ESV valves and burned to avoid dangerous materials harming people working at the plant. ESV valves are typically furnished with fail-to-open automatic actuators.

The ESD (Emergency Shut Down) valves are normally open and close only in an emergency situation in order to isolate certain parts of the processes, like burners in the boiler house. ESD valves are furnished with fail-to-close automatic actuators.

To make sure the ESD and ESV valve units will operate in an emergency situation, they have to be tested regularly. However, this does not guarantee that they will always operate in an emergency. Therefore, redundant systems are often built, so if one valve unit fails to operate,

the other will work. This means a substantial increase in capital investments and testing costs.

### Safety instrumented systems

Modern petrochemical plants are increasingly using safety-instrumented systems (SIS) to complement the process control system. Such safety systems often use specialty designed PLC's, called safety PLC's, which are providing a higher level of risk reduction.

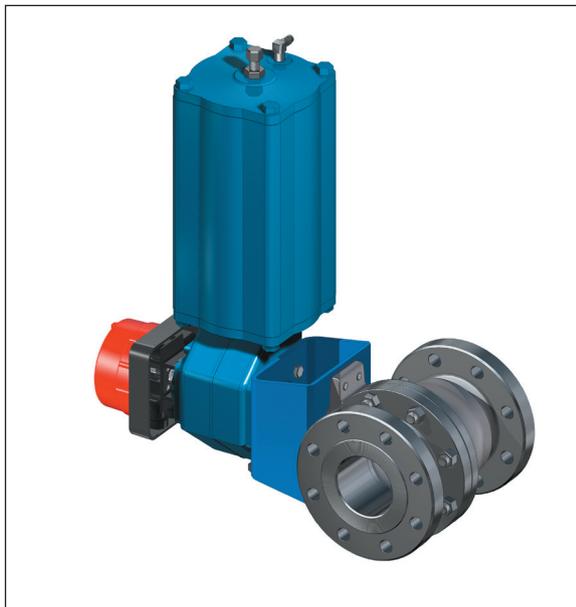
While safety PLC's have been successfully used to reduce risk, the final control elements like ESD's and ESV's can still fail dangerously and lower the safety protection of the total system.

### Metso Automation's Solutions Neles ValvGuard™, partial stroke testing system, The better way to assure valve operability

The Neles ValvGuard™, partial stroke testing system, is a new-generation, safety-management system that helps ensure that the ESD and ESV valves will always perform properly when needed. You can easily monitor and test valve performance for maximum availability while reducing overall operating costs.

#### Advantages:

- Huge cost savings
- Errors are minimized
- Automated on-line testing
- Testing without process shutdown
- Predictive maintenance
- Low cost and fast payback



Metso Automation X-MBV ball valve



Metso Automation T5 ball valve

- High reliability valve components
- Meets SIL 3 requirements
- TÜV Certified

Petrochemical plants have large numbers of ESV valves, so leaky valves could mean significant production losses. Also, sometimes it is very costly and difficult to determine which individual valve is leaking, thus wasting valuable media to the flare. To avoid this situation and make it possible to detect which valve is leaking, Metso Automation has developed a highly reliable and accurate on-line, acoustic leak-detection system for the Neles ValvGuard™, partial stroke testing system.

### **Metso ESD/ESV valves, the better way to assure increased risk reduction**

- X-MBV series modular ball valves
- Neldisc high performance butterfly valves
- T5/T2 series top entry high-pressure ball valves

#### **Advantages:**

- Rugged metal seats for long lasting and safe operation
- Fast quarter-turn operation
- Rotating stem with live loaded shaft seal to reduce fugitive emissions
- Designed for high performance and reliable operation

### **Neles B series ESD/ESV actuators, the better way to assure your ESD/ESV unit will operate when needed**

- Modified torque output curve for quarter turn ESD/ESV valve operation offers high output for seating and unseating situations
- Construction and mounting parts particularly designed for Metso ESD/ESV valves

The information provided in this bulletin is advisory in nature, and is intended as a guideline only.  
For specific circumstances and more detailed information, please consult with your local automation expert at Metso.

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