The Catalytic reforming process can be regarded as the refiner’s main tool to control gasoline octane level. The purpose of this process is to produce gasoline-blending stock. The improvement is achieved by converting paraffin and naphthenes into aromatics and isomers. Simply put, the catalytic reformer takes low octane value feedstock and converts it into relatively stable high octane value gasoline blending components.

In the process, hydrogen gas is produced as byproduct. The excess hydrogen produced by this process is a valuable feedstock to other refinery processes that require additional hydrogen.

The reforming process operates at high temperature levels up to 550°C (1025°F). Over a period of time, the catalyst becomes coated with coke, a natural byproduct of the reforming process, and requires regeneration.

Old reformer units use fixed bed reactors in series. Typically, three to four reactor beds are used in a cascade arrangement. These units are referred to as semi-regenerative catalytic reformers. Removing one bed at a time from service and physically opening the reactor and removing and replacing the catalyst achieve regeneration of this type of process.
The Lock Hopper Vent System

The modern catalytic reformer uses a stacked three-bed reactor with a continuous catalyst regenerator (CCR), where the catalyst is continuously withdrawn from the reactor, then regenerated, activated and fed back to the stacked reactor bed.

A series of lock hoppers, typically four complete lock hopper arrangements, are used to move catalyst from the reactor to the regenerator and back into the reactor. Each of these lock hoppers is fitted with a vent valve.

Catalyst falling from the reactor into the lock hopper contains a fairly large amount of hydrogen. After filling, isolating and inerting the lock hopper the gases are vented through the lock hopper vent valve. This valve must vent highly abrasive, catalyst-entrained gas while simultaneously achieving Class VI shut off.

A special double-seated globe valve previously served this application. This design had one metal seat, intended to resist abrasion damage imparted by the fluid, and one soft seat, intended to achieve the desired shut off classification. This solution has historically been plagued with leakage problems as well as high cost of repair.

Metso Automation Solution

This difficult and demanding application led to the successful development of Metso Automation’s solution, the Neles X-MBV ball valve. The special end-to-end dimension allows the X-MBV to retrofit in place of a globe valve without piping modification. The Neles J type solids proof seat prevents catalyst dust from getting behind the ball. This precludes the possibility of torque increase or seat back cavity abrasion damage. The materials of construction are selected for maximum resistance to abrasion damage allowing for long valve life.

The Neles X-MBV ball valve has been specifically designed to meet the requirements of UOP specification 671 and, with a Neles B1J single acting spring return or Neles BCM double acting actuator complete with accessories, provides the ideal lock hopper vent valve solution.
**Model Number and Description**

XA03DWUUS6SLJBDD

- **XA**: Full bore seat supported ball valve
- **03**: Valve size typically 2” to 6”
- **D**: ANSI class 300
- **W**: ANSI B16.5 raised face flange
- **UU**: Full compliance with UOP specification 671
- **S6**: ASTM A351 CF8M 316 stainless steel body construction
- **SL**: 316SS/NiBo ball construction
- **J**: Solids proof seat construction
- **B**: 316SS/CrC coating on seat
- **D**: Graphite packing and graphite body seal
- **D**: B8M studs and 8M nuts
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 Metso Automation.