

Fisher® Separator Letdown (HHPS & CHPS) Solutions



Severe Service



EMERSON
Process Management

Application Discussion

The hydrotreating process removes undesirable materials (sour gases) from a feedstock and converts heavy feedstocks into lighter components by selective reactions with hydrogen in a heated catalyst bed. This process typically is most used in the production of gasoline and diesel fuel to remove sulfur, nitrogen and certain metal contaminants.

The hydrotreating reactor operates at high temperature to convert 40 to 50 percent (volume) of the reactor effluent to a material that boils below 400 degrees. The effluent goes through heat exchangers to the hot high pressure separator (HHPS) where the hydrogen-rich gases flash off. The hydrogen rich gases undergo additional separation in the cold high pressure separator (CHPS).

Remaining hydrogen rich gases are sent to the first stage of the process for mixing with additional hydrogen and the fresh feed. The liquid effluent from both the HHPS and CHPS is sent to a fractionation column where the lighter gases are taken off overhead. Light and heavy naphtha, jet fuel and diesel fuel are removed as liquid side streams.

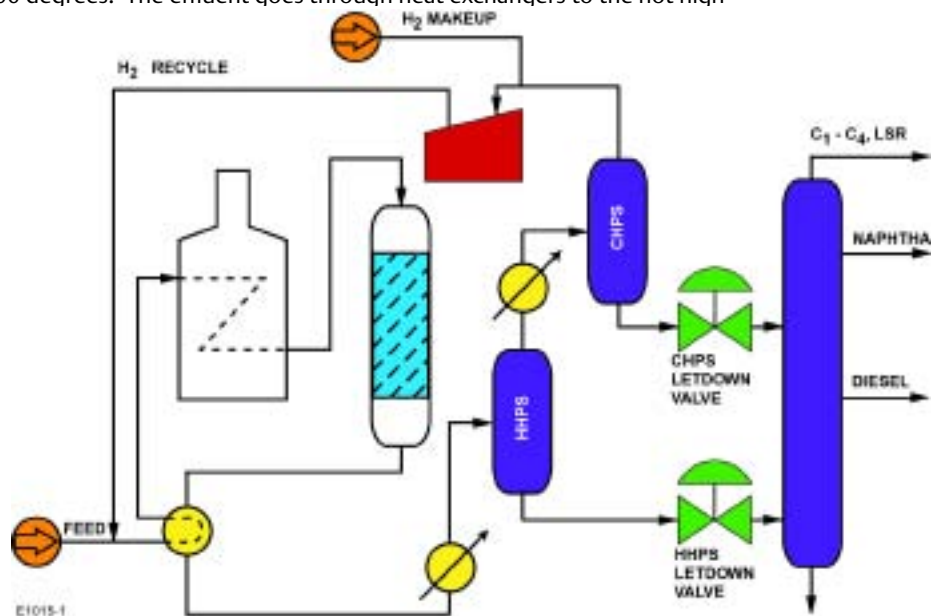
The HHPS and CHPS each have two letdown valves that maintain separator level to ensure proper separation of liquid and gas products. Because of the multiple constituents involved along with the entrained gases and catalyst, these valves are exposed to a number of challenges:

- Special sizing due to flashing and outgassing
- Vibration due to outgassing of entrained gases
- Erosion due to outgassing, cavitation, flashing and entrained catalyst
- High temperatures requiring thermally-compensated trim
- Internal corrosion due to entrained corrosive gases

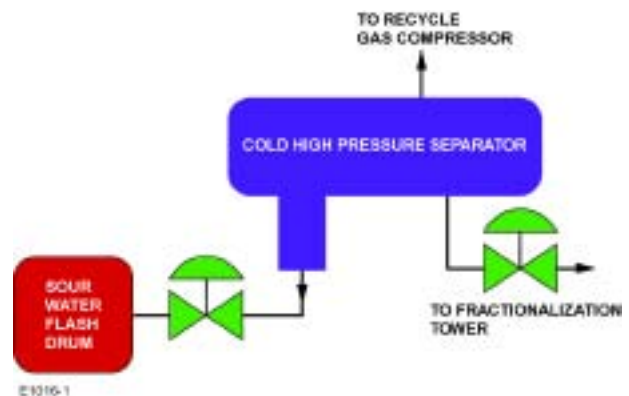
The valves also can be exposed to high pressure when closed, so tight shutoff (ANSI Class V or greater) is critical. Any leakage can result in extensive damage to the valve.

Emerson has specific Fisher sizing and engineered solutions for all separator letdown applications. These solutions are designed to address outgassing effects that can occur in most HHPS letdown valves and some CHPS letdown valves. They offer protection against cavitation, erosion, plugging and leakage.

Also, to ensure proper operation after installation, a Fisher FIELDVUE® Digital Valve Controller can be used to monitor valve performance. The FIELDVUE DVC provides diagnostic reviews without interrupting the process in order to identify potential performance issues. This helps to ensure proper operation and tight shutoff over the normal service life of the valve.

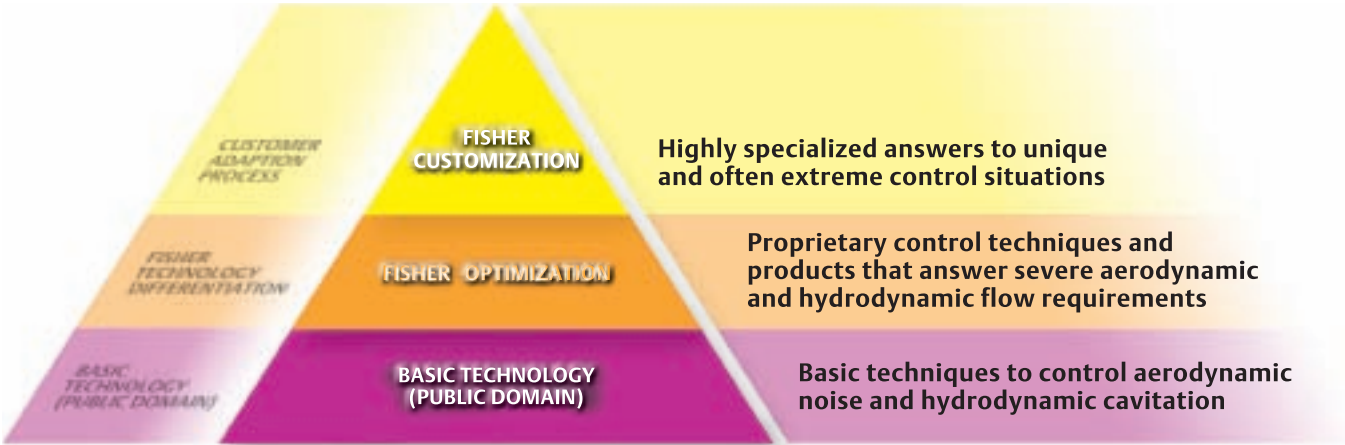


Generic Hydrocracking Process Flow Diagram



Cold High Pressure Separator and Sour Water Flash Drum

Severe Service Control Hierarchy



Separator Letdown – Control Valve Solutions

FISHER CUSTOMIZATION

A U.S. refinery chose correctly to address the effects of erosion, cavitation and outgassing by utilizing the Fisher DST-G valve. The DST-G was custom designed to negate the damaging effects of outgassing by staging the pressure drop yet still allowing particulate such as catalyst fines to pass through the valve. See [D351144X012](#) at www.Fishersevereservice.com for additional details.

FISHER OPTIMIZATION

DST Trim



- Patented, multi-stage, anti-cavitation control trim
- Combines axial and radial flow patterns that can pass particulate without plugging
- Compensates for volume expansion of flashing fluids via expanded area staging
- Features protected seat design that helps avoid clearance flow erosion for long-term shutoff integrity

NotchFlo® Trim



- Utilizes multi-stage, axial flow process to control pressure drop, prevent cavitation and pass entrained particles
- Features protected seat design that helps avoid clearance flow erosion for long-term shutoff integrity
- Offered in a wide range of materials to accommodate specific application needs

BASIC TECHNOLOGY



- Standard control valve, angle pattern sliding stem
- Valve installed flow down to minimize valve body erosion
- Hardened or special trim materials to extend service life

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The way you manage your key production assets directly affects your plant's performance and profitability. Emerson's Asset Optimization capabilities deliver world-class services and innovative technologies to increase the availability and performance of mechanical equipment, electrical systems, process equipment, instruments and valves for improved bottom-line results. Asset Optimization helps you improve process availability and attain peak performance, which means wherever you are in your plant's life cycle—startup, maximizing operations or life extension—by relying on Emerson's Asset Optimization capabilities, you'll be on the path to realizing the true potential of your plant's instruments and valves.

The Next Step

Contact your local Emerson Process Management sales office or sales representative location for more information or to make a purchase.

For severe service solutions, see us at www.FisherSevereService.com



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