

Diverter Valves for Special Applications

In virtually every chemical plant and every chemical process there exists a need to divert process flow from one pipeline to another. This may be accomplished by multiple valving or it may be done through the use of diverter valves specifically designed for this purpose.

The requirement of diversion of flow from one process stream to another may be as simple as having the ability to maintain one stream in service while another is inspected and/or repaired. Or it may be as complex as switching from one polymer filter to another as one filter becomes dirty and the pressure drop increases requiring a balance of pressures as one unit is taken out of service and another is brought on line with no interruption of process flow.

Process pumps are sometimes high maintenance items and are thus installed in parallel so that one may be serviced and/or repaired while the other carries the process load. With the use of a diverter valve, changing from one pump to another becomes an easy task with no process flow shut-down being necessary.

Diverter valves can also be used as dump valves when there is a process upset. Normal process flow goes through one side of the valve while the other side is closed. When an upset occurs, the process

side is closed, and the dump side is opened. Frequently the dump side is at right angles to both the process and dump side. Both may have pneumatic or hydraulic actuators for rapid response to a process upset.

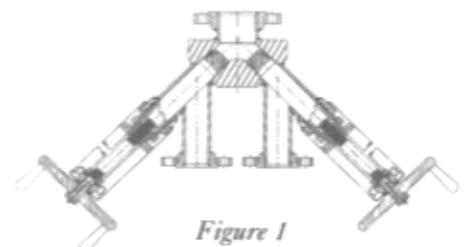


Figure 1

Figure 1 shows a diverter in which the process flow enters the top connection and the outlet flow is to either or both of the outlet lines exiting in parallel below the valve body. This configuration is frequently referred to as a Type 'M' diverter.

Figure 2A indicates the same basic design but with the outlet flow at right angles to the inlet flow. Here again, the outlet flow may be to either, both, or neither of the outlet connections. This

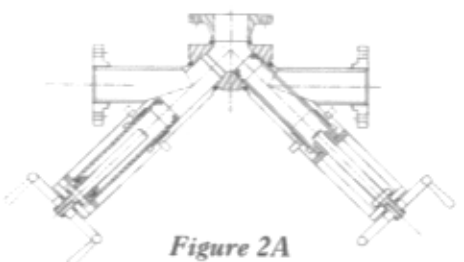


Figure 2A

Some Things To Think About

Mistakes are a fact of life: it is the response to the error that counts.

— Nikki Giovanni

Knowledge is free at the library. Just bring your own container.

— Anon.

There is only one boss. The customer. He can fire everyone in the company, from the chairman on down, simply by sending his money to someone else.

— Sam Walton

The best we can do is size up the chances, calculate the risks involved, estimate our ability to deal with them, and make our plans with confidence.

— Henry Ford

Why not go out on a limb? Isn't that where the fruit is?

— Frank Scully

There are markets and opportunities of immense proportions everywhere awaiting the courageous, the innovative and, above all, the fast. Speed is the indispensable ingredient in global competitiveness.

— John F. Welch
Chairman & CEO, G.E.

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design is referred to as a "T" Type diverter. This design frequently utilizes rotating, contoured plungers on one or both sides to assure smooth, unobstructed flow, particularly in polymer service. (See Figure 2B).

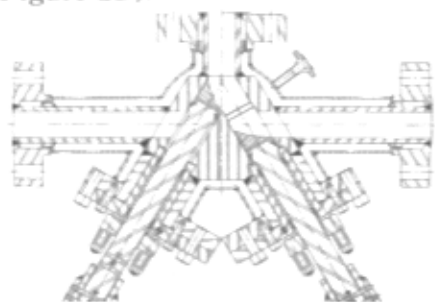


Figure 2B

In Figures 1 and 2, the angular relationship of the outlet ports may be changed to meet the requirements of the installation, either in the plane of the page or forward out of the page or away from the page.

Figure 3 shows an inline diverter frequently used where space restraints do not allow the use of other designs. Again, both the inlet and

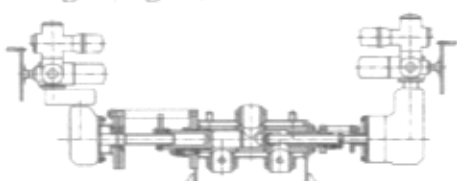


Figure 3

outlet connections may be rotated around the central axis to fit the piping requirements.

Figure 4 shows a large fabricated and jacketed diverter using standard stem and disc design. This design is particularly well suited for large sizes with large flow rates. The valve shown has a vacuum hood around the stem and packing area with a small test valve on the hood used to test for packing integrity under vacuum.



Figure 4

Full heat jacketing is available in all designs and may be zoned such that only the flowing side(s) is heated. All types of actuation may be used - manual, electric, pneumatic and hydraulic. One or both sides may be actuated as best suits the situation. Sizes up to 20" are available in ANSI Pressure Classes 150# through 2500#. Various materials of construction can be used - stainless steel, Alloy 20, Nickel, Monel, Hastelloy, Titanium, etc. as required by the corrosive nature of the flowing fluid.

Designs may be simple as shown in the figures above or as complex as required as shown in Figures 5, 6, and 7. Rotating plungers may be used to assure smooth, unobstructed flow with no "dead" spots or stagnant areas where material may collect and contaminate future batches or hinder valve operation as in Figure 2B. In all cases, the valves should be capable of disassembly in place for maintenance and repair.

If required by the system, one side of the diverter may have a straight discharge and the other side may have a characterized valve plug to actually control discharge flow or act as a level control valve or pressure reducing valve.

As with any application of special valving in the Chemical, HPI, or refining industry, it pays to contact a reputable valve manufacturer to discuss specific process system requirements prior to detailed design. Draw on the experience of the valve design experts to obtain the best possible configuration for the application at hand. This valuable assistance is always available at no cost to the system designer. ■

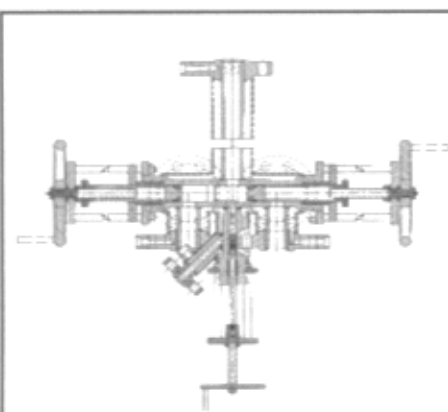


Figure 5

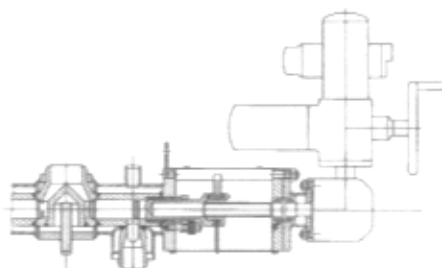


Figure 6

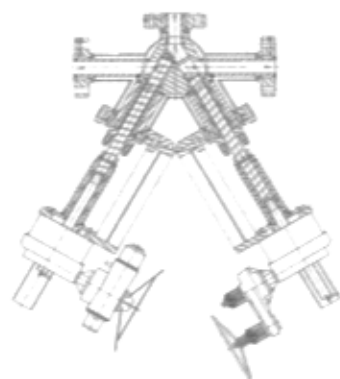


Figure 7

E.I. DuPont Company Revises Non-Destructive Testing Standards

The DuPont Company has revised its standards for "the semi-quantitative detection of leaks when a high degree of leak-tight integrity is required." This new procedure, SG4.1T MASS SPECTROMETER — HELIUM LEAK TEST eliminates the use of Freon (an environmentally unfriendly medium) in testing.

Two methods are used:

- 1) Internal pressurization with helium.
- 2) Evacuation of a component and application of helium to the outside.

The new standard very carefully details the proper safety standards to be considered when using helium, including but not limited to proper gauging, relief valving, proper isolation, component damage, and helium collection in confined spaces.

Mass spectrometer instruments are used to ionize molecules drawn from leaking equipment under test. Helium ions are separated and the

instrument displays a figure which is a function of the partial pressure of the helium drawn into the spectrometer tube.

The standard details the qualifications required of the personnel performing the test, both DuPont employees and contractors who may be certified by their employer, subject to DuPont audit.

The type of test equipment to be used is carefully detailed as to the manufacturer, make, and model number as well as calibration standards.

Drying requirements and cautionary statements are included.

In the testing of valves, the detector probe method is most widely used. Without going into the details of the actual test, the valve to be tested is charged with a mixture of helium gas, nitrogen or air to the lesser of its design pressure or 15 psig with a minimum of 10% helium. After proper calibration and a pressure soak of 30

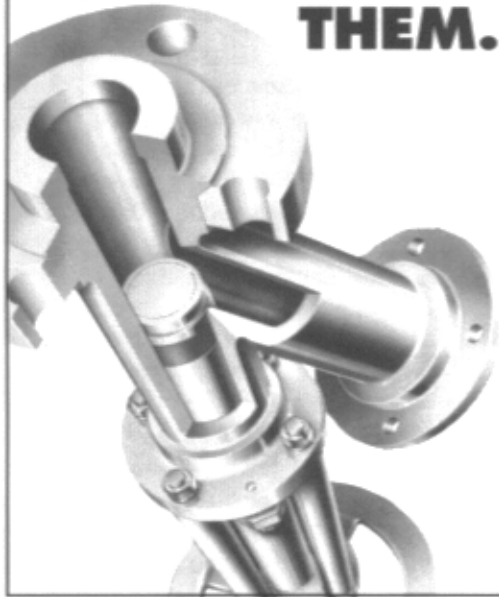
minutes, the test surfaces are scanned by passing the detector tip within 1/8" of the surface at a rate not exceeding 1 in./sec. Observed leakage rates are corrected for the amount of helium used and a leakage rate less than 1×10^{-5} std.cm³/sec is acceptable.

When testing valves to this new DuPont standard, Fetterolf draws a vacuum in the interior of the test valve and charges the valve with 100% helium. The detector probe method, is then used over welded joints, packing systems, and valve seats to test for leakage. Valve jackets are tested in the same manner. No leakage is tolerated during testing.

Fetterolf salutes The DuPont Company for authoring a practical, inexpensive, workable method of positive leak testing of pressure-containing components which gives positive results and is friendly to the environment. ■

FETTEROLF. WORLD'S LARGEST SELLING RAM VALVE:

**WE OUTSELL
THEM
BECAUSE WE
OUTPERFORM
THEM.**



FEATURES

- No clogs...No leaks. Full Opening, Free Flow.
- Using extended body, the body and plunger are flush with the I.D. of the vessel or pipeline.
- During installation, the valve body can be rotated within the loose bolting ring for ease in alignment.
- Seal ring: TFE to 500°F; other materials for temperatures from -350°F to 1200°F provide drop-tight shut-off from 100 micron vacuum to 6000 psi (ANSI 150 to 2500).
- Fail-safe options and controls.

OPTIONS

- Tested API Fire-safe designs
- Valves in: stainless and carbon steel; titanium; alloy 20; nickel; monel; Hastelloy™; Inconel™; and zirconium.
- Special custom designed valves and piping assemblies with integral welded jackets.
- 'Standard' drain and sampling valves can be modified to fit your needs.

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