

New From Fetterolf

Line Blinds for Total Equipment Isolation

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For total isolation of storage vessels, one from another, valves are not totally reliable. Removing a section of the piping or the use of line blinds is the only absolutely positive way to assure absolute isolation. API Standard 2217, "Guidelines for Confined Space Work in the Petroleum Industry" defines a confined space as "an enclosure with known or potential hazards and restricted means of entrance and exit." Paragraph 4.2 states "the confined space should be isolated by blinding, by disconnecting and blanking all lines connected to the space."

Line Blinds, sometimes referred to as spectacle blinds or figure eight blinds, are nothing more than a blind flange and a line-sized orifice attached by some means such that the user may simply swing from one to the other to open or close the piping.

There is much more than that to the story, however...

In today's world, there are regulations and rules of the game of vessel isolation that must be lived with. ANSI regulations cover temperatures and pressures for various materials; OSHA sets health and safety standards; EPA regulates what and how much of a substance can be released to the atmosphere; insurance companies are now setting standards for industry to abide by for the safety of its workers; employees themselves are monitoring their work situations

and are rightly refusing to work in dangerous or unsafe situations.

Properly designed, installed, and maintained line blinds can make life a little easier when faced with all these regulations.

A properly designed line blind is either welded or flanged into the piping system in a tank farm, in a piping transfer system or aboard a tanker or liquid-transporting barge. They consist of two body flanges bolted together, back to back, with either a blank (blind) or a full sized orifice (spectacle) in between with gaskets on both sides as shown in Figure 1.

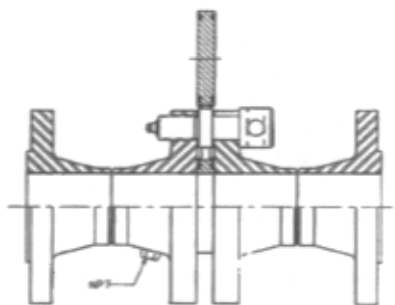


Figure 1

The bolts are actually jack-bolts which, when turned in the proper direction with the proper number of turns, separate the body flanges, until the spectacle plate can be rotated 180 degrees, to either open the line to flow or to stop the line flow.

Continued on page 2

Some Things To Think About

"Great minds discuss ideas.
Average minds discuss events.
Small minds discuss people."

—Adm. Hyman G. Rickover

"My grandfather once told me that there are two kinds of people: those who do the work and those who take the credit. He told me to try to be in the first group; there was less competition there."

—Indira Gandhi

"There are no shortcuts. We will continue to invest in the latest technology and place a strict emphasis on product quality, productivity, cost containment and sound management."

—J.F. Toot, Jr., CEO Timken Co.

"Improve the things you do right, not just cut down on the things you do wrong."

—Dr. Armand Feigenbaum

Line Blinds for Total Equipment Isolation

N.B. The Pipeline Must be Totally Depressurized and Drained Prior to Changing the Blind Position

Both the spectacle plate and the blind have a sealing member on both sides - normally an "O" ring which is compatible with the material flowing or a spiral-wound gasket for high temperature services over about 500° F (260° C). These seals may or may not need replacing when the blind position is changed (or the line blind is "thrown", as a change is frequently referred to.)

When it is necessary to throw the blind, the line is depressurized and drained. Positioning pins, if provided, are removed and the spreader bolts are successively rotated about forty-five degrees. *This is actually jacking the line apart between the body flanges.* The bolts are turned until the spectacle is free to move and may be rotated around the pivot bolt (Figure 2), or the spectacle is totally removed and reinserted between the body flanges. This removal and reinsertion can be a very difficult job due to the weight

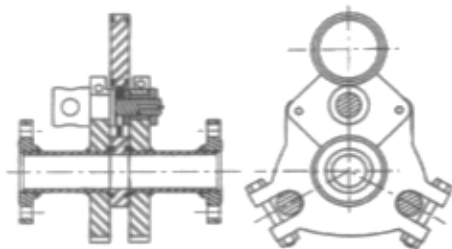


Figure 2

involved in large-sized blinds. The blind is positioned after rotation and the positioning pins are reinstalled. The spreader bolts are rotated in the closing direction, again at about 45 degrees at a time—this is important in that over tightening a single bolt may cause it to gall or "freeze" and the bolt may have to be cut from the line—a time-consuming proposition which should not have happened. Line blind manufacturers provide torquing requirements of the spreader bolts.

No matter what the position of the blind, open or closed, one can

easily see its position from a distance. This is not necessarily true when valves are used, and is certainly not the case when a "paddle" blind is used (similar to a ping-pong paddle sandwiched between two flanges.

The larger the blind, or the higher the pressure rating, the more spreader bolts are required (Figure 3). When more than three spreader bolts are used, two or perhaps four must be totally removed to swing the blind. In large-sized lines, piping alignment may be difficult to maintain.

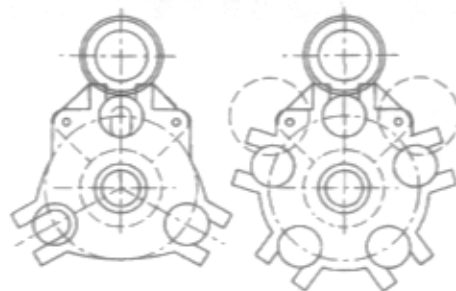


Figure 3

Proper maintenance is a must. Each spreader bolt should have a lubrication fitting. They must be adequately lubricated so rotation is easy. It is difficult enough to force the piping apart — a little grease can make the job a lot easier!

The bolts and nuts are precision machined from high tensile strength steel and should be zinc-plated for corrosion resistance. Special bolting material may be required for high temperature or cryogenic service, and alloy bolting should always be used for ANSI 600# and higher service. Likewise the materials of construction must fit the application. Special alloys for wetted parts must be compatible with the fluids in the pipe line for corrosion resistance and sometimes abrasion resistance.

Usually, blinds are of carbon steel construction. A frequently seen combination of materials is the use of carbon steel body parts and a stainless steel spectacle plate. Other alloys maybe used, however. In chemical service, Hastelloy, alloy 20, nickel, and Inconel wetted parts may be used. Line blinds can be manufactured to meet NACE standards if required and can normally meet all

European standards.

When used aboard ship, a Sermatel® coating is frequently used for protection of carbon steel. This baked-on finish provides excellent protection in a corrosive environment or aboard ship in salt-air atmosphere. Epoxy paint is also frequently specified for shipboard service.

Possible users of line blinds should be very careful in the selection of the type of blind to be used. Not all blinds are ANSI rated. The lower end of the market is sometimes served by manufacturers using nothing more than two weld neck flanges back to back, as shown in Figure 1 (page 1). In some of these designs, the spreader bolts are threaded directly into the flange hole. Should these threads gall or threads become stripped, the entire blind must be removed and repaired. Provision for lubrication of the spreader bolts is a must.

One design utilizes a compound lever and multiple pivot point system to separate the body flanges. Although considerably easier than progressively turning spreader bolts, the body flanges are still being forced apart and the piping still has to be moved. In larger sizes, a hydraulic pump and hydraulic cylinder must be used.

A newer Fetterolf Cam-Set® design (Figure 4) is designed around an internal cam system such that separation of the body flanges is not required and the pipe does not move when the blind is thrown. This version has a single actuation screw, perpendicular to the axis of the pipe

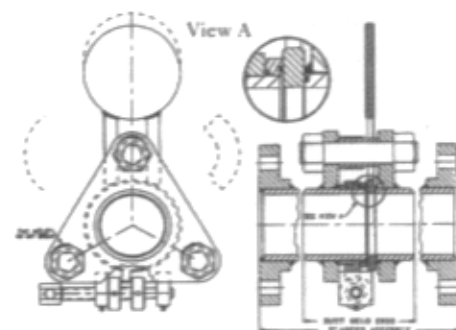


Figure 4

which, when rotated, slides a moveable inclined plane against a fixed inclined plane. This action moves the

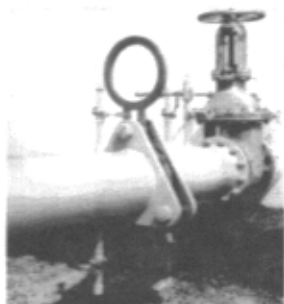
seal-carrying members away from the spectacle plate, allowing it to be rotated. This cam-actuated line blind can be operated by one man from one side of the pipeline. Jumping back and forth over the line to get at the spreader bolts is not necessary. The body flanges are of three bolt design. For strength, the bolt diameter increases with line size rather than increasing the number of bolts as with conventional design. These bolts are tack welded as they will never have to be used. All seals may be replaced with the blind in place in the line. Seals may be placed in the spectacle plate and blind if so specified. Internal seals, however, are protected from accidental mechanical damage or deterioration from exposure to sunlight.

Cam-Set® Blinds may be used with equal ease in both horizontal and vertical piping systems as the body flanges are not being forced apart and the piping does not move. Operating handwheels are available for rotating the actuator screw as the seals move away from the spectacle plate. Air cylinder actuation is available for remote operation if desired. Larger sizes, 20" and 24", are often used as quick-opening manways for access to the internals of a reactor or storage tank. Remember, be positive the vessel is totally isolated with line blinds on both incoming and outgoing piping so that nothing can possibly leak into the vessel, causing a personnel hazard. Minor design modifications will allow strainer screens to be installed in the spectacle plate. The blind may also be used as a holder for rupture discs, allowing rapid change when required. Drain connections on one or both sides of the blinds are available. Special piping lengths on either side of the blind may be fabricated for special situations. Standard spectacle plates are of full line size to minimize pressure drop but special applications may utilize the spectacle as a fixed orifice or use multiple spectacle plates with orifices of different sizes. Be sure the blinds you choose have positive locking devices and remember...

**VALVES LEAK DOWNSTREAM.
BLINDS DO NOT!**

GATX Terminal Corp. Selects Fetterolf Cam-Set® Line Blinds

GATX Terminal Corporation has installed Fetterolf Cam-Set Line Blinds in their liquid storage facilities in Paulsboro, NJ, and Philadelphia, PA. These line blinds provide excellent service in total isolation of one storage tank from another.



Paulsboro

Dave Wagner, Project Engineer at the Paulsboro facility, has 16" Cam-Set Line Blinds in service on various tanks storing petroleum

products such as gasoline and MTBE, a gasoline additive. As Dave explains, "These tanks are connected with 16" lines, and total isolation, tank-to-tank, must be maintained for inventory purposes as well as prevention of cross-contamination. Conventional line blinds, where the body flanges must be separated to throw the blind, could not be used as the pipe movement would dent or buckle the tank walls. The Cam-Set Blind, where the jack screw moves the seals away from the spectacle plate without separating the body flanges and moving the 16" pipe, are ideal and work perfectly. In addition, operators do not now resist the job of changing (or throwing) Cam-Set Blinds as it is so easy. Ours now have handwheels to make it even easier. With conventional 3-bolt or 5-bolt blinds, multiple quarter-turns on each body flange bolt are required as you move from bolt to bolt, jacking the body flanges apart and moving the pipe. Many times a 'strongman' will jack only one bolt, causing a thread lock-up and all sorts of associated problems of now trying to blind the line with locked-up threads."

In the Philadelphia tank farm, Fetterolf Cam-Set Line Blinds are smaller in size, 4" and 6", and are used to totally isolate storage tanks from one another as a wide variety of liquids are stored. John Semola,

Maintenance Supervisor, says, "I never know, from one day to the next, what tank will be changed to store what liquid, from benzene to hot wax.

"Prior to changing from one fluid to another, the tank must be cleaned and all lines handling incoming fluids must be 'pigged.' Positive shut-off must be assured on all lines to storage tanks whether it's a new incoming fluid, an outgoing fluid, or one in 'dead' storage. Any leakage could spell disaster.

"We have used 3-bolt blinds for years but they are hard to throw, particularly with some of the fluids we handle contaminating body flange bolts. Also it is difficult to spread the flanges and move pipelines in close quarters. In standard blinds, the "O" ring seals are exposed and get damaged or cut and do not seal when the blind is thrown — a problem unknown until the blind is changed.

"With the Cam-Set Blinds, it is a cinch to quickly change from closed to open by turning only one bolt and not moving any piping. Seals are internally contained and protected from damage. All we do is be sure spectacle and blind surfaces are clean prior to making a change.

"Over time, all the old 3-bolt blinds will be removed and replaced with Cam-Sets. Fetterolf will even make them with flange face-to-face distances we specify to cut down on piping changes required."

Cam-Set Line Blinds are available from Fetterolf in sizes 1" through 30", in pressure ratings and metallurgies required by specific customer installations. Special designs for shipboard, loading dock, and barge service are available. Cam-Set Line Blinds may be used in vertical piping and are rated to meet ANSI requirements. ■



Philadelphia