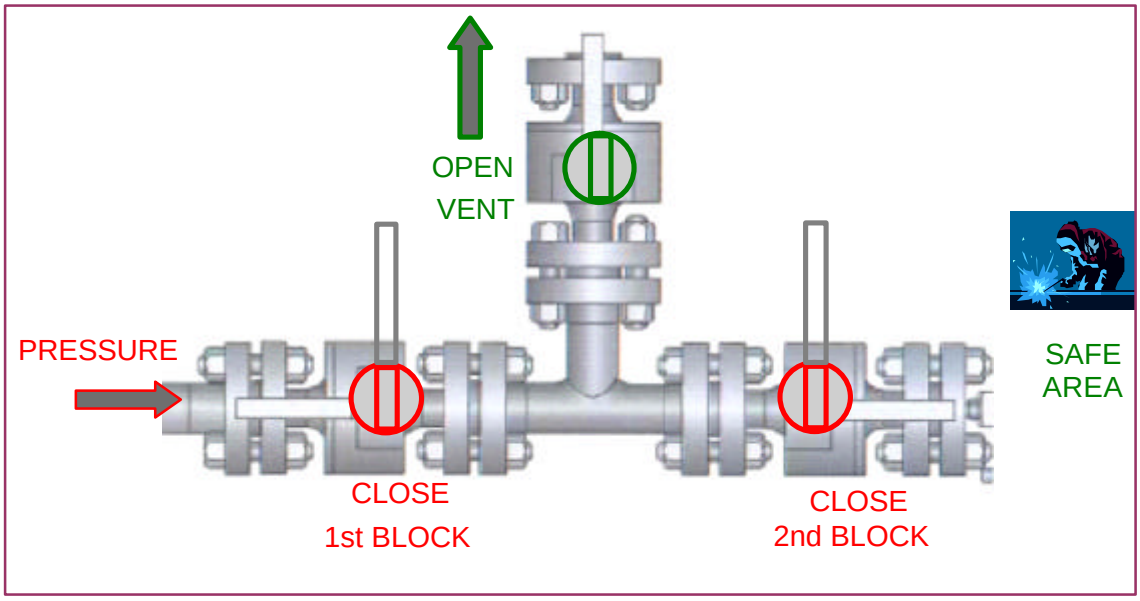
Improve Maintenance Safety with Double Block and Bleed Valves

In today's demanding oil and gas applications where the operating pressures and temperatures are increasing the need for safety and the need for assured valve shut off providing absolute and verifiable isolation, are regularly becoming the standard for critical applications.

Valves are a vital part of processes in the industry as they provide flow control and isolation. In an ideal world all valves would give 100% assured bubble tight sealing for their life span, unfortunately, for much of the industry this is not always the case. In demanding applications, service duties are rarely clean or kind to valves. The problems range from high velocities (particularly when opening valves on gas/ multi-phase flow against high differential pressure) to fluids that are entrained with foreign particles or pipelines affected by scale, corrosion, and other debris.

These problems are exacerbated where valves are protecting equipment that requires regular maintenance. In these situations plant operators demand two levels of isolation to ensure safety and integrity of the system. As a result, Double Block and Bleed (DBB) systems have been developed.

For many years the typical approach to provide double isolation is to have two valves in tandem and a bleed point between the valves to establish the sealing integrity of the upstream valve. This configuration is far from optimum as more space is required, with considerable extra weight and extra costs associated in the maintenance of having two valves in place.



Today, there are a number of advanced technologies available to end-users, each of these offer different benefits. H.S.Pipequipment is one of the UK's largest valve stockists and providers of flow solutions to the oil, gas and petrochemical industries. Through their knowledge and relationships with manufacturers, they are able to offer a range of products for DBB applications.

There are two main types of product grouping for this application, Instrument Double Block and Bleed (typically 2" and below where the application is pressure connections, chemical injection etc) and the larger and more demanding application of in line valves (typically these valves are 3" and above, used for process or equipment isolations.) There are a number of additional technologies and options available for the larger DBB valves.

The main products available in the market are: -

- Single Ball Valve with DBB seat sealing capabilities including double piston effects seat.
- Double Ball Valve in either cartridge AP1 6D single valve dimensions or special dimensions.
- Double Isolation Plug Valve.
- Twin Disc Triple Offset Butterfly Valves.
- Split Wedge or Expanding Gate Valves.
- Through Conduit Valves.

The traditional product for the industry has been the soft-seated ball valve. In practice the soft seats in these valves are vulnerable and can often require regular replacement. In these applications, trunnion mounted metal-seated valves have often been utilised. However, whilst these valves give excellent isolation within the factory environment, in severe service it often does not take much for the surfaces to deteriorate resulting in seat leakage.

It is well known that the softer the seat, the easier it is to get a seal. The problem is in critical applications the medium is often abrasive and erosive, as a result seating materials get progressively harder. In the case of DBB, the pressure upstream may try to assist in sealing the first valve, though the seats are often damaged due to the high differential pressure. In addition problems often occur with the second valve, as the pressure in the cavity is so low there is no pressure energising the seats.

The first novel approach to double block and bleed was to use the cavity relief on a trunnion mounted ball valve to provide verification of leakage. The problem here was that the seats were still vulnerable to damage and ingress. If the first seal failed the spring force on the second was often not enough to contain the pressure, therefore, the second seal was prone to fail. Various seat designs have been utilised to overcome this problem, and generally 2 seat designs are utilised.

In DDB ball valves the finished product can be side entry, top entry and also welded body and can be supplied in an above or sub-sea configuration. The bleed system for these valves can be (globe, gate or ball valves). The main advantages of these types of valves compared to the traditional DBB approach include space and weight saving, lower costs, fewer leak paths a number operational advantages when actuation is required.

The DIPV (Double Isolation Plug Valve) design has two separate valves in one single face-to-face body; the advantage being the second valve is completely independent to the first. It is compact, lightweight and lower cost when compared to ball valve technology. Furthermore, it is reliable, rugged and low maintenance. The design has typically opposed plugs to maximise the passage through the valve. The protected seats enable throttling and some multi-phase flow to occur with minimal problems and the metal to metal seats trap the sealant film to give 100% bubble tight sealing, which can be maintained over the life of the valve.

A newcomer to the market is the triple offset butterfly valve. The advantages of this valve is the broad seal contact width that is less susceptible to leakage resulting from minor damage to the sealing service and the torque seating capabilities. However, there are some additional advantages of the butterfly valve design, which include, low initial cost, minimal maintenance, low weight and a small footprint.

Derrick Mackenzie, General Manager of H.S.Pipequipment's Aberdeen office comments, "Double Block and Bleed valves have evolved to provide greater savings in weight, space and installation times. However, the greatest savings are the reduction of leak paths to the atmosphere, which reduces the risk of potential hazards and improves maintenance safety."

Correct valve selection is critical to the smooth and efficient running of all plants. For over 30 years H.S.Pipequipment has assisted their clients by identifying, supplying and distributing the correct valve for applications throughout the industry. This has been accomplished through HSP's established relationship with leading manufacturers including, Serek Audco, Hobbs Valves UK and Valbart. HSP can fulfil orders of any size or complexity, from a single valve to a multi-million pound EPC project. HSP's capability and strength covers the full supply chain from assisting in the selection and technical evaluation of the best product through order placement, expediting and delivery.