



## **Disc Material Selection for Concentric (Rubber Lined) Butterfly Valves**

This article discusses some factors that specifying engineers and other users should consider when making their selection of disc material for particular applications of concentric (rubber lined) butterfly valves. Historically, most makers of this product type have offered three basic disc materials (presented in order of increasing cost/price): 1) nickel plated ductile iron (DI), 2) aluminum bronze (AlBr), and 3) stainless steel (SS), generally in the cast form ASTM A351 CF8M. While there are still other choices out there, this article will discuss only these three.

DI discs, representing the least-cost option, are probably over-specified (which can give rise to problems, as discussed later). AlBr discs, the middle-of-the road cost offering, and now often the standard for many manufacturers, also sometimes find their way into services where they also don't belong. Finally, on the high end of the cost spectrum, SS discs usually don't end up in the wrong place because someone has to go out of their way at the specification and purchase order level to end up with them. So the basic question to answer is – which disc is best used where?

Dry Bulk, Clean Dry Air, and Similar Services DI discs are generally very good in these services, although in compressed air systems where moisture might be present from time to time, AlBr or SS might be a better option. The properties of DI that make it attractive in the dry bulk services especially are its relatively high modulus of elasticity (approaching that of the CF8M), and (with a good plating system), generally serviceable corrosion resistance – i.e. the discs are stiff, moderately resistant to corrosion, and inexpensive – so a good value as long as the application doesn't demand more than the parts can deliver.

Water and HVAC Water/Glycol Systems (without adverse chemical additives) The main thing to remember about water is this – all water is not the same – some water supplies (even while potable) can be aggressive from the corrosion perspective. With that as the principle consideration, AlBr is the best option for most water and HVAC system applications. It offers outstanding corrosion resistance at only a slight increase in valve cost, thus eliminating a major risk if DI is specified but then attacked by corrosive water in service.

Oils, Non-Aggressive Chemicals, Acids and Alkaline Fluids AlBr can often handle these types of intermediate services between water and the more aggressive chemicals. Users should check with their own service experience first, corrosion guides such as 'Compass' next, and valve manufacturer's literature and/or inside sales support to verify the application if there is any question.

Aggressive Chemicals More aggressive chemicals that can't be handled by either DI or AlBr are often precisely where the SS discs should be used. This presupposes that the other parts of the valve are compatible (most notably the liner or sealing element, but the stems and other key pressure retaining parts also), and that the service is not so dangerous as to require an entirely different valve type.

The main take away from this article is for users to choose AlBr for water and HVAC systems generally, as DI discs present an unacceptable risk for sometimes extreme corrosion that can be very expensive to correct after the fact. See the pictures below of DI discs coming out of water service where the water was aggressive after less than 24 months exposure. This won't happen every time, but for the sake of the price adder for AlBr, it needn't happen at all.

