



# GLENFIELD INVICTA'S EXPERTS SOLVE RESERVOIR PROJECT WITH OPTIMAL VALVE SOLUTION

The Alwen Reservoir is the largest man-made 'lake' in Wales, covering some 900 acres. Located 14 miles south-west of the market town of Denbigh, the reservoir was constructed between 1911 and 1920 to provide water for the town of Birkenhead on The Wirral. Alwen Reservoir is adjacent to Llyn Brening, another reservoir in the River Dee regulation scheme.

Lewis Civil Engineering, based in Pontyclun, South Wales, is leading a refurbishment project at Alwen Reservoir for Dwr Cymru Welsh Water (DCWW). A vital element of the enabling works was the creation of a duplicate water supply arrangement as the existing mains were to be shut off whilst work was being carried out on the reservoir.

Lewis Civil Engineering contacted the team at Glenfield Invicta for guidance on the optimal choice of valve for the temporary supply pipeline. The temporary supply involved an over-pump arrangement at the top of the dam connecting to an existing supply pipeline 30m below the reservoir level. The operational parameters stipulated by DCWW were challenging: a maximum pressure of 25m to enter the existing works combined with the ability to achieve a range of flow rates with a maximum of 462l/s.

The natural choice for this application would have been a pressure reducing valve. However, due to the small differential pressure requirement of 5m, the pressure reducing valve (PRV) would have been working close to its limit. As it was critically important that pressures in excess of

25m were not introduced into the existing infrastructure, an alternative control valve solution was required.

*'The Alwen Reservoir project demonstrates the engineering expertise of the Glenfield Invicta team.'*



Setting of valve open position



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# Case Study

## Dams & Reservoirs



We analysed the application in detail and considered using eccentric plug valves, needle valves and butterfly valves. The eccentric plug valve, like the pressure reducing valve, would also be operating close to its limit. The needle valve, although it would have been suitable, would have been at risk of becoming clogged due to the raw water passing through it; the needle valve has a smaller internal flow path and, when an anticavitation device is added which has additional smaller slots, any twigs, stones or solids may become stuck and it could ultimately clog over time.

Our engineering team considered whether a Series 75 concentric butterfly valve would meet the operating criteria. To accommodate the range of specified flow requirements at the available pressures, a Series 75 DN450 concentric butterfly valve would be operating within a range of 35% and 45% open position. This is well within the allowable limits for this valve. Consequently, it was decided to install the Series 75 concentric butterfly valve.



Locking of hand-wheel for security



Isolation gate valve arrangement

The valve was installed and, in order to ensure that it was working as expected, the Glenfield Invicta team were on site to commission the valve and ensure it was set to the correct position given the flow conditions. Due to the critical role of the valve, a locking device was fitted to ensure accidental operation was avoided. A locking plate was bolted to the flange of the valve and a stainless steel chain and lock was connected to the gearbox handwheel.

If there is a requirement in future to modify the flow rate, the locking device can be removed and the valve opened to the required position.

The commissioning of the valve was successful. It is now fully operational allowing the works on the main reservoir to proceed as planned.

The Alwen Reservoir project has shown that butterfly valves can be used for flow control applications and, in certain cases, can provide greater control when compared to alternatives such as pressure reducing and eccentric plug valves.

Clearly, the operating conditions for each system must be analysed closely to ensure the correct valve type, size

and specification is selected. When selecting flow control valves for a particular application, particularly where relatively low pressure differentials are involved, the concentric butterfly valve should definitely be considered. A concentric butterfly valve can provide the required flow control performance with the added benefits of being more economical, easier to operate, and requiring less space compared to other valve types referenced in this commentary.

Glenfield Invicta is part of the global AVK Group of companies. This gives us access to an unrivalled portfolio of different valve types. This choice means our engineers are able to specify the optimal valve for a particular application. There is a danger that limiting the choice of valve can sometimes lead to the use of a product that doesn't fully meet the exact specification requirements.

The Alwen Reservoir project demonstrates the engineering expertise of the Glenfield Invicta team. It is also a prime example of one of the AVK Expect customer promises: **Expect solutions, not only products.**



Installation prior to backfill



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