

Hydrogen Valve Selection Checklist

A quick guide to choosing hydrogen gas valves for storage, transfer, refuelling and fuel cell systems.

Hydrogen gas valves need to suit the whole system, not just the pipework.

Check the valve function, materials, sealing, test evidence, installation, approvals and safety requirements before use in hydrogen service.

- 1 Define the valve role**
Isolation, fine flow control, reverse-flow protection, pressure control, shut-off and overpressure protection all need different valve designs.
- 2 Confirm the system conditions**
Check pressure, temperature, hydrogen purity, flow rate and whether the valve will be used in storage, transfer, refuelling or fuel cell equipment.
- 3 Check the hydrogen-facing parts**
Review the body, wetted parts, seats, seals, stems, springs and packing. The parts in contact with hydrogen need to suit the service.
- 4 Choose suitable materials**
Select materials that reduce the risk of hydrogen embrittlement and suit the expected duty cycle, stress level and operating conditions.
- 5 Select the valve type**
Match the job to the valve: hydrogen ball valve, needle valve, check valve, change-over valve, solenoid valve, control valve or safety relief valve.
- 6 Review sealing and connections**
Check sealing design, connection type and assembly method. Hydrogen can escape through very small gaps around seals, fittings and threads.
- 7 Ask for leak test evidence**
Check how the valve has been tested, what gas was used, what leak rate was accepted and whether the test matches the system requirement.
- 8 Confirm hazardous area needs**
Review site zoning and electrical requirements. DSEAR, ATEX or Ex-rated equipment may be needed where flammable atmospheres can occur.
- 9 Plan overpressure protection**
Where pressure can rise above safe limits, include suitable protective devices and check the discharge path, vent location and exclusion zones.
- 10 Plan inspection and records**
Set up leak checks, spare parts, maintenance intervals and service records from the start so the valve can be managed across its service life.