

Hydrogen production, storage, and transportation involve highly reactive processes that place significant stress on equipment and structures. Corrosion, leaks, and material degradation are common issues that can compromise operational performance and pose safety risks.

Some typical problems found in the hydrogen industry include, but are not limited to:

- Leaks in pipes and pipelines caused by hydrogen-induced cracking or corrosion
- Storage tanks suffering from internal and external corrosion
- Electrolysers impacted by wear, leaks, and corrosion from exposure to hydrogen, oxygen, and water
- Pumps and compressors damaged by pressure fluctuations and environmental wear
- Cracked or worn concrete in foundations and secondary containment areas

Failure to address these challenges can lead to unplanned downtime, costly repairs, and potential safety hazards.

Belzona's comprehensive range of composites and high-performance coatings is specifically designed to repair and protect critical hydrogen infrastructure. Our solutions are applied in situ, minimizing downtime and reducing the need for equipment replacement. By offering cost-effective, long-lasting repairs, Belzona ensures your hydrogen operations remain efficient, safe, and reliable.

Independent testing on both Belzona 1381 and Belzona 5892 was carried out to support applications in the Hydrogen Industry. The test work was to confirm the leachable levels of Total Organic Carbon / Total Inorganic Carbon (TOC/MC) and other species into ultrapure water. This confirms their suitability for coating electrolyzers.



Belzona Is a Global Manufacturer of Repair Composite Materials & Industrial Coatings.



Visit us and check out our solutions



For more information, please contact your local Belzona® representative:



US • UK • Canada • China • Thailand
belzona.com

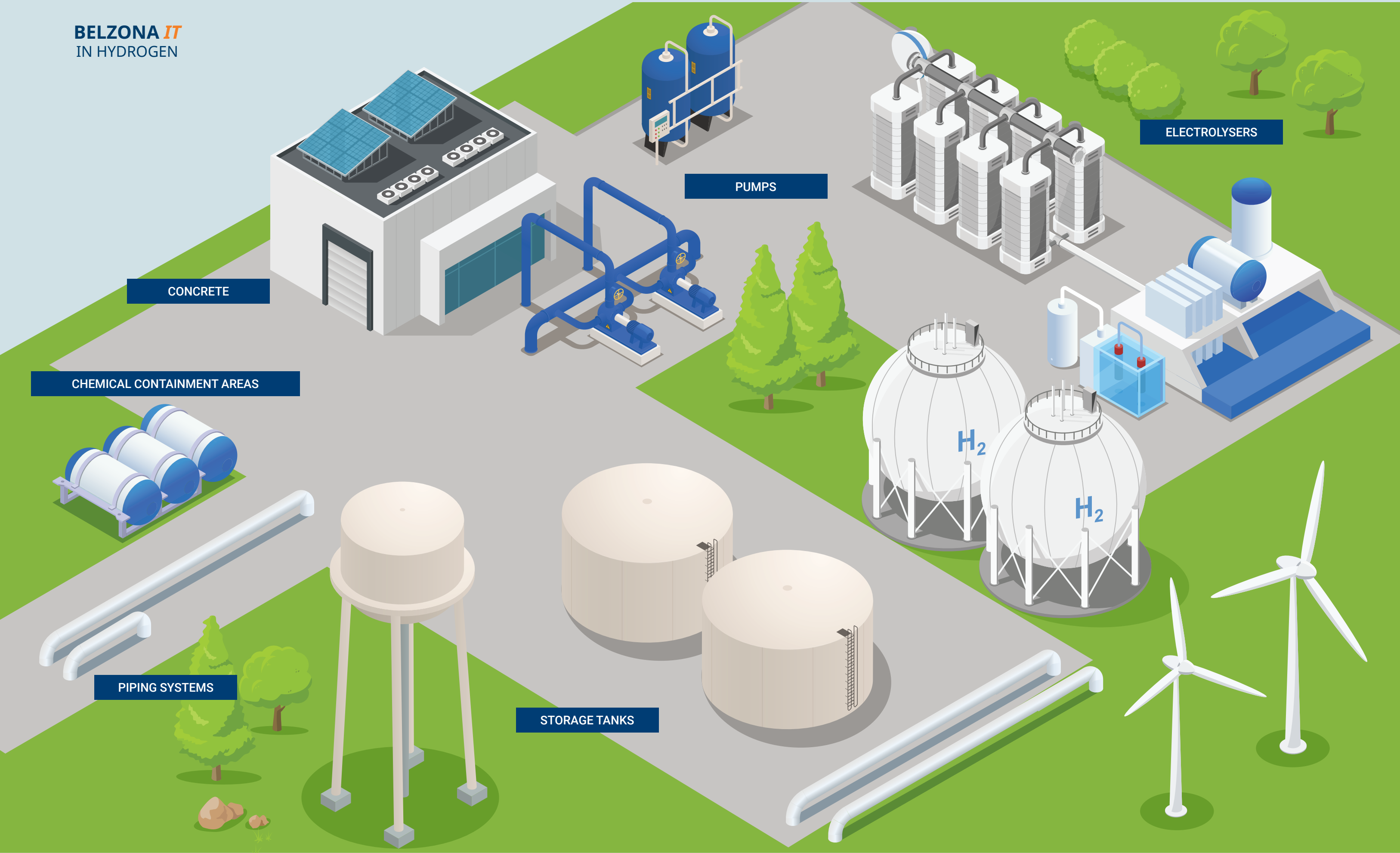


ISO 9001:2008
Q 09335
ISO 14001:2004
EMS 509612



ASSET INTEGRITY AND HIGH PERFORMANCE IN HYDROGEN FACILITIES





This process flow chart of a typical hydrogen facility is designed based upon data retrieved from various sources. It is to be used as general guidance only. It describes the most common repair and maintenance problems found in hydrogen plants together with Belzona solutions which could potentially help mitigate such problems. It does not aim to supersede any drafted process flow charts in use at these plants. It is strongly recommended that each user of this guide contact the local Belzona representative to discuss the specific needs and operation conditions of their hydrogen facility.

ELECTROLYSERS	STORAGE TANKS
<p>TYPICAL PROBLEMS: Electrolysers operate in challenging environments with hydrogen, oxygen, and water, which can lead to corrosion, leaks, and wear that compromise their performance.</p> <p>POTENTIAL SOLUTIONS: Belzona's metal repair composites and fluid-grade materials are ideal for rebuilding damaged metal and addressing corrosion issues. Additionally, Belzona's high-performance coatings provide excellent corrosion resistance and long-term protection. Belzona 5892 has completed extraction testing in ultrapure water (equivalent to Type 1 in ASTM D1193), confirming its suitability for coating electrolysers.</p>	<p>TYPICAL PROBLEMS: Corrosion and structural weakening in hydrogen and feed water storage tanks.</p> <p>POTENTIAL SOLUTIONS: Tanks often require base sealing, erosion and corrosion protection, cold plate bonding and live leak sealing. Coating with Belzona can also protect your tank from stress corrosion cracking.</p>
PIPING SYSTEMS	PUMPS
<p>TYPICAL PROBLEMS: Pipes transporting hydrogen are susceptible to damage such as Hydrogen Induced Cracking (HIC), embrittlement, and corrosion.</p> <p>POTENTIAL SOLUTIONS: Cold-curing composite materials can repair pipes that have become weakened or holed and protect them from further degradation. Belzona's wraps (such as Belzona SuperWrap II), along with composite patches and pads can also be applied to damaged areas to create a long-lasting repair.</p>	<p>TYPICAL PROBLEMS: Pumps often become corroded over time or fall victim to pump cavitation.</p> <p>POTENTIAL SOLUTIONS: Belzona's cold-curing metal repair composites can restore heavily damaged pumps. Epoxy coatings can be used for erosion-corrosion protection to prevent further deterioration, reducing maintenance costs and increasing the efficiency of the pump.</p>
CONCRETE	CHEMICAL CONTAINMENT AREAS
<p>TYPICAL PROBLEMS: Damage to foundations, flooring and structural supports.</p> <p>POTENTIAL SOLUTIONS: The Belzona 4000 series can repair, resurface and protect concrete surfaces against wear and chemical exposure. Belzona's slip-reduction systems, such as Belzona 4411 (Granogrip), can be used for potentially hazardous areas like stair treads and walkways.</p>	<p>TYPICAL PROBLEMS: Deterioration of containment area as well as mechanical or structural damage caused by: acid attack, pH reduction, carbonation, sulphate attack, caustic attack, microbial degradation, corrosion of reinforcement and abrasive wear. Breakdown of the concrete can lead to a loss of integrity and strength, increased porosity and environmental risks.</p> <p>POTENTIAL SOLUTIONS: Belzona 4000 series materials for the repair and protection of concrete subject to abrasion, impact, and chemical attack such as concentrated acids. Belzona 5800 series for protection from physical, chemical, or bacterial attack in a diverse range of environments.</p>