

HYDROGEN EMBRITTLEMENT

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Hydrogen embrittlement in valves is a serious problem in various industrial applications, especially in the petrochemical and power generation industries. This phenomenon occurs when hydrogen penetrates the metal structure of the valve and affects the mechanical properties of the material.

The causes of hydrogen embrittlement can be manifold. One common source is the use of media containing hydrogen in the processes through which the valve passes. When the metal of the valve comes into contact with hydrogen, it can diffuse into the material and become embedded in the metal lattices. There it can disrupt the structural integrity of the material, which can lead to cracks and fractures, even in materials that appear to be sufficiently resilient.

Consequences:

- Machine downtimes, production losses
- Significant safety risks, serious accidents

The solution:

The selection of suitable materials is crucial.

Certain alloys are less susceptible to hydrogen embrittlement and extend the service life of the valves. In addition, special coatings or surface treatments can be applied to slow down or prevent the penetration of hydrogen into the material.

Important: The nickel content of the alloys must be at least 10%.

Careful monitoring and maintenance of the valves is also essential. Regular inspections and testing can help to identify potential signs of hydrogen embrittlement at an early stage and take appropriate action before serious problems occur. This can include implementing preventative maintenance programmes or replacing valves if critical embrittlement is detected.

Overall, addressing hydrogen embrittlement in valves requires a holistic approach that includes material selection, design, operating conditions, monitoring and maintenance. By implementing appropriate strategies and technologies, industrial plants can be operated more safely and reliably, minimising potential risks to people and the environment.

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