Different Types of Corrosion

- Recognition, Mechanisms & Prevention

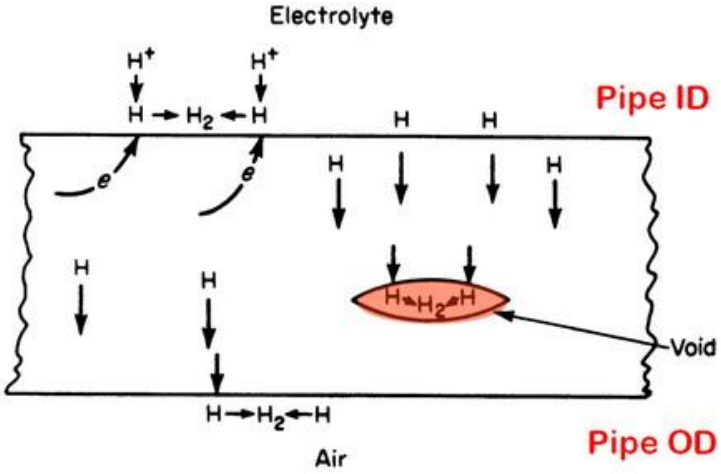
Hydrogen Blistering

Recognition of Hydrogen Blistering

What is hydrogen blisteering?
Hydrogen Blistering (HB) refers to the formation of subsurface planar cavities, called hydrogen blisters, in a metal resulting from excessive internal hydrogen pressure. Growth of near-surface blisters in low-strength metals usually results in surface bulges.

Mechanisms of Hydrogen Blistering

What causes hydrogen blistering? Hydrogen ions are reduced to hydrogen atoms that adsorb on the steel surface. Some of the hydrogen atoms will diffuse through the steel and accumulate at hydrogen traps, typically voids around inclusions.



When hydrogen atoms meet in a trap and combine, they form hydrogen gas (H_2) molecules in the trap. The accumulation hydrogen gas inside the extremely small cavity will lead to the buildup of excessive internal hydrogen pressure. At certain times, this internal hydrogen pressure will become sufficient to cause the steel to blister.

Blisters occur usually in low strength steels (<80ksi yield strength) and are formed preferentially along elongated nonmetallic inclusions or laminations in linepipe steels.

Prevention of Hydrogen Blistering

How to prevent hydrogen blistering? Hydrogen Blistering can be prevented through:

- Control of impurity of steel.
- Avoid the hydrogen source.
- Baking to remove hydrogen.

For more details on Hydrogen Blistering

Where can I learn more about hydrogen blistering? More details on hydrogen blistering are included in the following corrosion courses which you can take as in-house training courses, course-on-demand, online courses or distance learning courses:

Corrosion and Its Prevention (5-day module)
API 571 Damage Mechanisms Affecting Fixed Equipment in the Refining and Petrochemical Industries (5 days)
Corrosion, Metallurgy, Failure Analysis and Prevention (5 days)
Marine Corrosion, Causes and Prevention (2 days)
Materials Selection and Corrosion (5 days)

If you require corrosion expert witness or corrosion consulting service on hydrogen blistering, our NACE certified Corrosion Specialist is able to help. Contact us for a quote.
